TROPICAL DISEASES BUREAU.

# TROPICAL DISEASES BULLETIN.

Vol. 21.] 1924. [No. 7.

## LEPROSY.

HASSELTINE (H. E.). **Studies upon Leprosy. XXXIV. Further Statistics of Leprosy in Hawaii.**—*U.S. Public Health Service. Treasury Dept. Public Health Bull. No. 130.* 1922. Dec. pp. 1–11.

This paper continues the records of *Public Health Bulletins* Nos. 33 and 66 from 1913 to 1921 inclusive, the numbers of admissions in the last year being double that of 1913, owing to a number of lepers having recently surrendered voluntarily to obtain the improved treatment—a most satisfactory feature. In spite of this the average annual incidence per 1,000 population has fallen from 0·45 for the decade 1902 to 1911 to only 0·33 per mille during the last ten years, showing that the incidence is gradually lessening. The table of the ages of the lepers shows that 40 per cent. entered segregation before reaching the age of 21, and another 36 per cent. between the ages of 21 and 36, leaving only 24 per cent. in the latter half of life. Association with lepers before segregation was admitted in 48 per cent. of the 665 cases, the most frequently infected relatives in order of frequency being brother or sister 110, father or mother 67, uncle or aunt 56, cousin 28, friend 26, grandparent 19, and son or daughter 13. The duration of the disease before segregation was within one year in 193 of the 665 cases, or nearly one-third, within two years in 311, or nearly one-half, so that over one-half the cases had over two years in which to infect others before they were segregated; this, it is pointed out, is due to hiding of cases, which "has done much to reduce the power of segregation in the prevention of the disease." Since the introduction of injections of soluble preparations of chaulmoogra oil in the treatment it has been found that early cases yield to treatment more rapidly than those of long standing, and when this becomes generally known "it may be predicted that a reduction in the incidence of leprosy greater than ever seen in these islands will become evident." Since a number of recovered cases have been discharged on parole the proportion of lepers coming within the first two years of the onset of the disease has risen materially, and one released man brought his daughter in an early nodular stage, six weeks' treatment of whom removed the nodules and the bacilli.

L. Rogers.

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HASSELTINE (H. E.). **Studies upon Leprosy. XXXV. Statistical Report on Cases of Leprosy which have left Segregation on Parole.**—*U.S. Public Health Service. Treasury Dept. Public Health Bull. No. 130.* 1922. Dec. pp. 12–24. [12 refs.]

This report on the results of paroling apparently cured or non-infective lepers is of great interest. Since 1912 up to the end of 1921 249 were released, but the average number set free annually up to 1918 was only 11, while during the last three years, as a result of the improved treatment, the average discharges were 57. Europeans had a slightly higher discharge rate then other races; approximately 30 per cent. of those entering segregation have been paroled. The paroled include more females than males in proportion to their numbers, while the percentage decreased with the rise of age from the lowest ages up to 26 to 30 years, after which there is a slight increase owing to the number of chronic nerve cases long in residence, so that the younger lepers have the more favourable outlook. The duration of the disease on first being segregated has a considerable influence, 33 per cent. of those of under one year's duration and 25 per cent. under two years, 21 to 24 per cent. of those of from 2 to 5 years' duration having been paroled, against 11 to 13 per cent. of between 5 and 7 years' duration. Longer cases, who represent the survival of the fittest, which include many chronic nerve ones, in which the infection has died out leaving the patients much crippled, again show higher rates of release. The percentage of recurrences was also lowest in those who had been affected less than a year on admission, again showing the better prognosis in early cases, leading the author to conclude that "the early recognition and treatment of leprosy is the point on which most emphasis should be placed." Thus of those affected less than a year 1 in 3 was paroled, in 1 to 2 year old cases 1 in 4, in 3 to 4 year cases 2 in 9, in 4 to 5 year cases 1 in 5 and of those having the disease 5 to 6 years only 1 in 10 was released as having become uninfective.

The duration of treatment table shows that nearly 70 per cent. of the paroled were in segregation less than two years and about 10 per cent. over 10 years, while of 168 paroled cases treated less than two years 17 per cent. relapsed, and of 74 treated over two years 14 relapsed. With regard to the type 73 out of 143 anaesthetic, 108 out of 382 nodular, and 30 out 119 mixed cases were paroled, so in proportion to the admissions more nerve than nodular ones were released, the nerve form being generally recognized as the mildest and least fatal. It is significant that in the earlier years no nodular cases were paroled, but with the improved treatment they are clearing up in numbers. On admission 157 of the cases were bacteriologically positive; these had all become negative before release. Experience has shown that recently "the requirements for parole became less rigid and possibly too lenient," but much good has been done by thus teaching the public "that the disease is amenable to treatment and that the life in segregation is far better than the usually gloomy picture so often painted in books and magazine articles. This has caused a considerable number of lepers to surrender themselves and receive treatment, thereby removing dangerous cases from the community." Repeated bacteriological examinations will be made before release in future, when it is hoped relapses will be less frequent.

L. R.

NEW SOUTH WALES : Leper Lazaret. **Thirty-Second Report on Leprosy in New South Wales, for the Year ended 31st December, 1922.** [MILLARD (R. J.), Med. Supt.]—*Report of the Director-General of Public Health New South Wales for the Year 1922.* pp. 94–101. (1923. Sydney : Alfred James Kent, Govt. Printer.)

On 1st January 1922 there remained 22, there were 3 admissions, including one escaped leper from the Queensland Lazaret, 2 died and 2 were discharged, one as recovered after treatment with sodium morrhuate and chaulmoogric esters, and one returned to Queensland; 21 remained at the end of the year. The usual tables and details of the cases are given with dates of admission, but no record of the duration of the disease. Chaulmoogra oil and hydnocarpates internally, sodium morrhuate injections during the first half of the year, oscol stibium and for the last two months E.C.C.O. treatment have been given, but no opinion of their value is recorded, the notes showing very little improvement in most of the cases. Half of the patients had been segregated 10 or more years, and three-fourths 5 or more, so the duration of their disease must have been considerably longer.

L. R.

BOURGIN, DECROP & SALLE. **Endémie et prophylaxie de la lèpre au Maroc.**—*Congrès de la Santé Publique et de la Prévoyance Sociale Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 137–142.

Leprosy is widespread in Morocco, 7 nodular, 16 nerve and 13 mixed cases having been seen in Fez during 1920. In the middle ages the disease was epidemic. Its contagiousness is undeniably through intimate contact leading to inoculation of abrasions of the skin, slight unrecognized cases being sometimes sources of infection, while some persons appear to be immune, as in the case of a woman who had 23 leper lovers, but escaped the disease. The authors advise leprosaria for town lepers, for the more contagious nodular cases and those discharging the bacilli from their noses; and in the villages compulsory notification, the prohibition of certain trades and the creation of institutions for looking after the infirm and recalcitrant lepers.

L. R.

NIGERIA : Medical Research Institute. **Report on the Lepers at Yaba Asylum after Six Months' Treatment by the Method Suggested by Harper** [by YOUNG (W. A.), Assistant Bacteriologist].—*Ann. Rep. on the Med. Research Inst. for the Year 1922.* pp. 36–38. (1923. Lagos : Govt. Printer.)

This is a report on six months' treatment of the lepers at the Yaba Asylum by Harper's method of intravenous injections. Other methods were often objected to by the patients on account of the pain following intramuscular injections, including moogrol. They preferred the daily intravenous injection of 10 to 12 minim doses of moogrol 500, ether 500, and iodine 1 part, although it caused immediate strong coughing, and was followed by febrile and local reactions and leucocytosis. In some cases it was difficult to find sufficient veins to continue them for long, and in time the injections became more painful on this account; after three or four months all but one asked to return to the muscular injections. These in turn were objected to, and finally a mixture of moogrol, iodine to give a distinct brown colour, with chalk

and water to make an emulsion, was given up to 10 drachms daily, a day or two's rest being given if they reacted. At the time of reporting all the cases were still positive bacteriologically, the ulcers were healing or had healed, and they felt better, while three had shown great improvement, but an early nerve case was unchanged. The results are considered encouraging, but longer time is necessary to allow of the value of this treatment being decided.

L. R.

BRITISH GUIANA: [(a) **Report on Public Leper Asylum, Mahaica, E.C., Demerara.** (b) **Extracts from Dr. Frendo's Special Report on Moogrol Treatment, Leper Asylum.**] [FRENDO (J. A.), Med. Supt.] —*Report of the Surgeon General, British Guiana, for the Year 1922.* pp. 28–32. (1924. Georgetown: "Argosy" Co., Ltd.)

There were 248 lepers in the asylum at Demerara on January 1st 1922, 96 admissions and re-admissions; 29, or 8·4 per cent., died, 39 were discharged or absconded and 276 remained at the end of the year.

The average number of lepers was 277. Moogrol treatment was used. Only a few slight febrile reactions were observed; in several cases nodules broke down followed by healing, while ulcers may heal at the same time. No toxic symptoms were observed. Photos showed facial improvement following absorption of nodules, trophic ulcers also healed in some nerve cases, and discoloured anaesthetic patches disappeared with partial recovery of sensation in some, while in many cases muscular tone was improved. The conclusion is reached that improvement was noticed in several cases, but it is too early to say if it will prove permanent. Apparently moogrol is the most hopeful drug and its use should be continued.

L. R.

DE ALMEIDA (Ribeiro). **A'Margem do Problema da Lepra.**—*Sciencia Medica.* Rio de Janeiro. 1923. Dec. 31. Vol. 1. No. 6. pp. 275–277.

According to the latest statistics there are 5,000 lepers in S. Paulo, amongst a population of five million, and the accommodation for them is obviously inadequate, comprising only 34 small leprosaria scattered throughout the State. The writer recommends the construction of four or five more, built on the type of the "Model Leprosarium" of S. Paulo, and the passing of laws for compulsory notification and segregation.

H. Harold Scott.

CAPUTO (Vincenzo). **La Lepra in Calabria—un caso di lepra tubercolare. Contributo terapeutico.**—*Giorn. Ital. d. Malattie Veneree e d. Pelle.* 1923. Oct. Year 58. Vol. 64. No. 5. pp. 1126–1132. With 1 plate. [27 refs.]

Leprosy in Calabria is probably imported by returning emigrants, chiefly from America. Cases are not numerous. In Cariati (Province of Cosenza) amongst 4,000 inhabitants there have been about 20 since 1890. At the present time there are only two. In Longobucco, in the same Province, with 7,000 inhabitants there is but one case; in Crucoli (Catanzaro) four cases have been reported amongst 3,000 inhabitants. The author gives a detailed account of a severe case, a man aged 48 years, who appears to have contracted the disease from

his uncle, a leper, with whom he had been closely associated. Various forms of treatment were adopted between the years 1919–1922, including 138 injections of chaulmoogra oil, 20 of them intravenous, totalling 375 cc. of the preparation. He also had 18 injections of cacodylate of sodium, the maximum dose being 5 cc. There was no appreciable benefit derived from all this, and for 18 months the patient stopped all treatment. He then returned in a much worse condition, and Antileprol (Bayer) was tried. It was given by mouth in capsules containing 0·5 gm., the maximum dose being 5 gm. and the total 125 gm. He also received intramuscular injections, 5 per cent. in cycloform, maximum dose 5 cc., total 150 cc. Improvement was marked, nodules disappeared and the bacilli seen on histological examination of nodules diminished, and the vision also improved. Iridectomy was performed and the patient left with vision 2/10, and he was able to resume his work as a trader.

H. Harold Scott.

ROGERS (Leonard). **The Incubation Period of Leprosy.**—*Indian Med. Gaz.* 1924. Feb. Vol. 59. No. 2. pp. 65–68.

The vexed question of the length of the incubation period of leprosy is dealt with in a scientific manner. The importance of a decision upon this is inestimable, for treatment, if it is to result in cure, must be begun early. The incubation period has been variously stated to be from one year or less to ten years or more, the longer periods being probably due more to latency, or to the overlooking of slight symptoms, especially in the anaesthetic form, than to actual unduly prolonged incubation; but the author here has proceeded from definite facts and shows that the period depends very largely on the mode and length of exposure to infection; in other words, on the dose of the virus and the frequency of its repetition. Under conditions of direct inoculation, incubation may be as short as six months; with close contact, such as sleeping in the same bed as a leper, the average period is twenty months; with less intimate contact, such as would arise amongst those dwelling in the same house, it proves to be a little under three years; lastly, where contact is less close still, mere association, as, for example, where children are allowed to play with an infected child, five years may be regarded as an average. The practical bearing of the investigation is that known contacts should be kept under observation and examined periodically in order to ensure early detection of the disease and timely initiation of treatment.

H. Harold Scott.

MUIR (E.). **Report on Leprosy Research.**—*Ann. Rep. Calcutta School of Trop. Med., Inst. of Hyg. and the Carmichael Hospital for Tropical Diseases for the Year 1923.* pp. 35–37.

Tests are reported of the comparative efficiency of hydnocarpus esters, those made from oils not having the properties of the chaulmoogra group of rotating polarized light, and also those made from coconut oil with little unsaturated fatty acid, such as those prepared from linseed oil, and the conclusion is arrived at that although the linseed has a definite effect in leprosy, the chaulmoogra preparation gave decidedly better results, indicating that the beneficial effects of hydnocarpus and chaulmoorga oils partly depends on the carbon ring group peculiar to this series, and partly to their unsaturated fatty acid

as a class. Thymol, as advised by Sumatra workers, has also proved beneficial, but further experience is needed on this point. External applications of trichloracetic acid to the leprous lesions has resulted in rapidly clearing up the lepromata of the skin in many cases. Potassium iodide internally often enables beneficial reactions to be obtained with ethyl esters in comparatively small doses, so injections of 50 per cent. hydnocarpus esters in pure olive oil are advised to contain 10 per cent. of thymol in gradually increasing doses, together with a local application by a glass rod covered with cotton wool of 20 to 30 per cent. of trichloracetic acid in distilled water at intervals of 7 to 14 days.

The most encouraging results are obtained in early cases, and experience shows that leprosy can almost always be diagnosed clinically long before it has become infectious, as shown by negative results of bacteriological examinations in early cases. "We have further found that most early cases lose all signs of active disease within a few months if they remain regularly under treatment and comply with instructions given with regard to sanitation, diet and general habits. The most hopeful method of dealing with leprosy must therefore depend on early diagnosis and early treatment. To carry this out dispensaries are essential, which must be situated within easy reach of the patients and conducted by medical men who are well qualified to diagnose and treat leprosy."

L. R.

MUIR (Ernest). **Leprosy a Self-healing Disease.**—*Lancet.* 1924. Feb. 9. pp. 277–280. With 2 figs. [4 refs.]

The tendency of leprosy to undergo spontaneous recovery, pointed out by HANSEN and others, is due to a very slow and gradual production of immunity to the lepra bacillus, aided by the fact that, unlike tubercle, vital tissues are not affected and death nearly always results from complications. The enormous numbers of lepra bacilli present in nodular cases, without necessarily any great impairment of general health, shows its low toxicity. The course of leprosy shows a curve with few bacilli and low immunity in the first stage, many bacilli with still low immunity in the second stage of rising curve, and a third stage of descent with increasing immunity and resolution and disappearance of the lesions and bacilli, although not until great damage, deformity and crippling have been produced. Both animals and man when in good health show great resistance to infection, a resistance-lowering disease, such as chronic bowel disease, syphilis, etc., often preceding the outbreak of leprous lesions. The leprous lesions also show three stages: firstly, the quiescent phase with multiplying bacilli, but little toxaemia; secondly, the reactionary phase with setting free of toxins and inflammatory reaction in the lesions accompanied by fever, during which the bacilli show granular staining and breaking up, affecting a variable proportion of the lesions; and, thirdly, the stage of resolution with subsidence of the inflammatory reaction and gradual disappearance of the thickening of the tissues and of the lepra bacilli. Different lesions may show the various stages at the same time with spreading in one part and clearing up of another area. During the reactionary stage bacilli as well as toxins may be set free with the formation of small inflammatory nodules, which may quickly disappear again if some immunity has been established.

These stages are of great importance in regard to treatment, as in the first stage of low immunity any depressing conditions should first be removed; antigens, such as possibly defatted acid-fast bacilli, to increase the immunity, and the fatty acids of hydnocarpus and chaulmoogra oils are of value, combined with counter-irritation by infiltrating the ethyl esters into the subcutaneous tissues under the skin or nerve lesions or by the external application of a 1 in 3 solution of trichloracetic acid in distilled water painted on every six to ten days. In the second stage the same remedies should be used, especially the esters of the fatty acids, with special caution to avoid inducing severe reactions, while trichloracetic acid is now of great value. In the third stage with a fair degree of immunity all the above remedies may be pressed, as considerable reactions are generally followed by marked improvement, and there is far less danger of an increase of the disease than in the second stage, large injections of the esters of the fatty acids being given, and if sufficient reaction is not induced iodide of potassium should be given internally, beginning with half a grain daily, and increasing until reactions are induced or the patient's tolerance is reached.

The prognosis is improved by the fact that leprosy tends to be a self-healing disease, and when the third stage is reached there is little chance of recurrence, and if negative bacteriologal examinations have been obtained over a period of two years in this stage, the leper may be considered cured, but a similar condition during the first and second stages should be considered one of relative cure, and any condition lowering the general resistance may be dangerous. Experience is required in recognizing the different stages, which are not clear cut, but any case advanced to the borderland of the third stage may be treated as one in that stage. The object of treatment is to cut short the disease in the first or second stages and to hasten resolution in the third by causing moderate reactions.

L. R.

i. IMPEY (S. P.). **Leprosy.** [Correspondence.]—*S. African Med. Rec.* 1924. Feb. 9. Vol. 22. No. 3. pp. 63–64.

ii. KIDD (Leonard J.) & iii. SHAW-MACKENZIE (J. A.). **Leprosy: a Self-Healing Disease.** [Correspondence.]—*Lancet.* 1924. Mar. 1. p. 464, and Mar. 8, pp. 517–518.

i. Impey writes, in reference to MUIR's paper on Leprosy: A Self-healing Disease, to point out that as early as 1894 he drew attention, in an essay published by the New Sydenham Society*, to the frequency with which leprosy infection dies out, especially in the nerve form, rendering the leper no longer infective or in need of segregation.

ii. Kidd mentions having been shown by Dr. KAURIN in Norway in 1891 a healthy girl who had recovered from leprosy spontaneously.

iii. Shaw-Mackenzie writes once more to draw attention to his former paper [see this *Bulletin*, Vol. 18, p. 391], pointing out that sodium chaulmoograte, morrhuate and oleate stimulate the fat-splitting action of lipase, and may account for the effects of these substances on the bacilli of leprosy and tuberculosis. [See *Brit. Med. Jour.* July 7, 1923 for a paper by ROGERS on this point and in which Dr. Shaw-Mackenzie's work is referred to.]

L. R.

* IMPEY (S. P.) On Spontaneous Recovery from Leprosy.—*New Sydenham Society.* Vol. 157. 1895. pp. 209-226.

MONRAD-KROHN (G. H.). **The Neurological Aspect of Leprosy ("Spedalskhed")** (Vid.-Selsk. Skr. 1.M.-N.Kl. 1923. No. 16.) —78 pp. With 39 text figs. 1923. Christiania: On Commission by Jacob Dybwad.

This valuable monograph gives a lucid and well-illustrated account of the nerve form of leprosy based on minute examinations of 63 Norwegian cases and a knowledge of the literature of the subject. The pathological anatomy of the nervous system in leprosy is first briefly reviewed, and emphasis laid on the lesions being essentially due to an ascending neuritis due to lepra bacilli in the peripheral parts of the nerves, while in advanced cases the spinal ganglia and the posterior columns of the spinal cord may show secondary degenerative changes.

Of the cranial nerves the sensory portion of the fifth and the seventh are most affected, the different qualities of sensation being equally diminished as a rule, the frontal and supraorbital nerves sometimes showing visible thickening. The facial nerve frequently shows a characteristic involvement of its peripheral portion, especially the muscles of the upper part of the face, producing ectropion of the eyes, usually bilateral, and of the supraoral muscles with dribbling of saliva and difficulty in pronouncing labials, while lagophthalmus is very common; facial paresis or paralysis has been found in 69·5 per cent. of his cases, while a portion only of the face muscles fail to respond to the faradic current. The other cranial nerves are rarely affected.

Motor disturbances begin in the distal parts of the limbs and spread slowly to the more proximal parts, being essentially due to a peripheral neuritis, producing the claw and the simian hand, but not extending above the forearms, and corresponding parts of the lower extremities. Coordination is seldom affected and never to any great degree.

Sensory disturbances begin with hyperaesthesia, neuralgia often bringing the patient to the doctor, and go on to hypaesthesia. Here again the different qualities of superficial sensation are as a rule affected to approximately the same extent, for although all kinds of dissociations are met with they are never complete. In maculo-anaesthetic leprosy the anaesthesia corresponds more or less to the areas of the macules, but are more pronounced on those of the limbs than on the trunk. A number of charts of the distribution of the loss of the sensations of touch, pain and heat and cold are given. On the other hand, deep sensation and joint sense are well preserved. Thickening of the nerves was most frequently found in the following order, ulnar, great auricular, tibial behind the internal maleolus, supraorbital, peroneal according to LAEHR. The deep reflexes are little affected; vasomotor disturbances appear as coldness and cyanosis of the hands and feet; anidrosis is frequent in the anaesthetic areas and can be brought out by pilocarpine, glossy skin, pigmentations and depigmentations, pemphigus, loss of hair, perforating ulcers, dry necrosis and concentric atrophy of the bones of the fingers and toes are the result of secretory and trophic disturbances, but the nails are often preserved in spite of atrophy of the small bones. Mental changes chiefly occur as depression or persecutory delusions.

The diagnosis of nerve leprosy is commonly helped by the presence of skin lesions, but may be difficult in their absence, and depends mainly on the presence of an ascending polyneuritis, the presence of partial facial paralysis already described, thickening of nerve trunks and the absence of incoordination and other spinal cord symptoms, which serve to differentiate it from syringomyelia,

progressive muscular atrophy, amyotrophic lateral sclerosis and other diseases of the cerebro-spinal axis, which may in some respects resemble it.

L. R.

UNNA Jr. (Paul). **Beitrag zur Frage der tuberkuloiden Lepra.**—*Virchows Arch. f. Path. Anat. u. Physiol.* 1923. Vol. 246. pp. 253–261. With 1 fig. [29 refs.]

After describing in detail a case of nodular leprosy with a few anaesthetic patches, some theoretical matters are considered regarding the pathological differences between the tubercles of leprosy and of tuberculosis, and the author concludes that the reaction is in proportion to the number of the bacilli and that different stages of the disease are met with in the same subject. He obtained negative results in experiments on monkeys, and refers to KYRLE's work, in which he inoculated monkeys with leprosy nodules and made sections of portions of the skin removed at intervals of 35 days and found in the first piece proliferation of the epithelioid cells and the formation of lepra-vacuolated large cells containing numerous acid-fast elements; in the later section there were small nodules of epithelioid cells, very few giant cells and no acid-fast bacilli, but very numerous small round cells resembling nodules of tuberculosis, the lepra bacilli having now been destroyed owing to the resistance of monkeys to the infection, from which they recover.*

L. R.

GOMES (Emilio). **Sobre a transmissão da lepra pelos mosquitos.**—*Brazil-Medico.* 1923. Dec. 29. Year 37. Vol. 2. No. 26. pp. 379–381.

A brief review, mainly historical, of the transmissibility of leprosy by insects. The author concludes that the mosquito is the sole transmitter on the grounds that: 1. Cases are met with in which no contact can be traced; 2. Leprosy occurs only in countries where there are mosquitoes; 3. Rigorous disinfection and isolation will not prevent healthy subjects in the vicinity from becoming leprous unless anti-mosquito measures are also taken in hand.

H. Harold Scott.

HENRY. **Note sur un case de lèpre.**—*Rev. Méd. et Hyg. Trop.* 1924. Jan. Vol. 16. No. 1. pp. 26–27.

The interest of this case is that it commenced in a child aged three years, who had been separated from his leper parents two months after birth, his grandparents also having been lepers. The first sign was a red patch on one thigh noticed in November 1922, which in January had become larger and now showed anaesthesia, and two further patches had appeared on the limbs. The exposure to infection was therefore only two months and the incubation period three years.

L. R.

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* *Frankfurter Zeitschr. f. Pathologie.* 1916. Vol. 19. heft 1/2.

MUIR (E.). **Nerve Abscess in Leprosy.**—*Indian Med. Gaz.* 1924. Feb. Vol. 59. No. 2. pp. 87–89. With 2 figs.

The writer has met with two cases of abscesses forming within the greatly thickened nerves of leprosy, and he gives illustrations of such a case affecting the medial cutaneous nerve just above the elbow, and forming a tumour the size of a pigeon's egg, which was found on incision to contain yellow pus free from organisms demonstrable microscopically or by injection into guineapigs. A little higher up in the nerve was another small cavity connected with the first one, while there was typical anaesthesia and alteration in the colour of the skin in the distribution of the nerve, leaving no doubt regarding the diagnosis. He has seen another similar case with four nodes on the ulnar nerve, the lowest of which was found to contain pus. He is not aware of any similar record.

L. R.

TRAVERS (E. A. O.). **The Treatment of Leprosy at the Leper Asylum, Kuala Lumpur, Selangor.**—*Fifth Congress of the Far Eastern Association of Tropical Medicine,* Singapore, September, 1923.

The ethyl esters prepared from *Hydnocarpus wightiana* oil in MUIR'S E.C.C.O. mixture was used in 37 cases, of which 27 had been treated for the full twelve months, all being bacteriologically positive nodular or mixed cases. Of these 10 had improved, 11 not improved and 6 were worse, the number of injections having varied from 20 to over 50. In most the improvement was slight, although in one case of only three months' duration it was very great, but, on the whole, the results were disappointing, and women and children object to the pain of the injections.

On the other hand, the writer noticed remarkable improvement in several lepers who treated themselves with a Chinese preparation of chaulmoogra nut combined with two other drugs, nine cases being tabulated, of which five were found to be negative bacteriologically by Dr. STANTON. The preparation was found to consist of 2 parts of chaulmoogra nut (*Taraktogenus kurzii*), 1 part of hemp seed steamed and dried and ground as fine as possible, and 1 part a Chinese seed (Pak Chut Lai). Only well preserved nuts should be used, and not rancid ones, to avoid stomach trouble, and the writer suggests that in extracting the oil some important substance in the nut may be left behind. Since April 4th, 1923, some eighty lepers have been treated by this preparation, given orally in doses beginning with 15 grains twice daily and increased to 30 grains twice a day without severe gastric trouble. The treatment is popular, women and children taking it readily, while the cost is low, only thirty dollars a month for eighty cases, and a large number of cases have shown healthy reaction and decided improvement. In ulcerated cases 0·5 to 1 grain of tartar emetic intravenously resulted in complete healing of the ulcers in 13 cases, improvement in 8 and no effect in 10 cases, but no benefit was produced in unulcerated lesions. Most asylum cases are too advanced on admission to allow of much hope of recovery, so the public should be educated to recognise the early signs of the disease, and the paper concludes with the following hopeful statement: "When it is generally understood that, if taken in time, the progress of the disease can be arrested and that in a large proportion of cases leprosy can actually be cured, there is no doubt that the lepers will come for treatment directly they realize that they are afflicted with the

disease. The importance of this cannot be too greatly emphasized, and I am convinced that when we are in a position to treat leprosy from an early stage we shall be able definitely to cure the disease."

L. R.

ROBINEAU (Marcel). **Le traitement de la lèpre dans les leproseries d'Ebolowa, Yedjang, Ngalan.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 142–154.

This paper deals with work already reviewed (see Vol. 20, p. 822, of this *Bulletin*), but gives some further details regarding the results obtained by the use of aiouni and eucalyptol, chaulmoogra oil, and of atoxyl and arrhenal consecutively, all intramuscularly, in a series of cases. In 30·9 per cent. of 42 macular cases complete disappearance of the disease was obtained, but in 35 maculo-atrophic cases only retrogression of the symptoms was got in 29 cases. Of the 13 recovering cases 11 were females.

L. R.

MAPLES (E. E.). **Treatment of Leprosy.**—*Nigeria Ann. Med. & San. Rep. for the Year 1922.* pp. 31–32.

The results of treatment at the Native Hospital, Calabar, are recorded, sodium gynocardate having been used intravenously, but no definite conclusion has been arrived at, "although the cases seem to be improving, and declare that they feel much better generally." One early nodular case treated by this and other methods for four years has been bacteriologically clear and free from all symptoms for two years and "to all intents and purposes he appears to be cured."

On page 51 it is reported regarding leprosy that "The long contemplated movement against this widespread indigenous infection has not yet been materialised and there is little immediate prospect of any change."

L. R.

PARRA (Ricardo F.) & SANTOS (Jorge E.). **Un año de tratamiento de la lepra por los esteres etílicos de los ácidos grasos del aceite de chaulmugra en Agua de Dios. (Colombia.)**—*Repert. de Med. y Cirug.* Bogotá. 1923. Dec. Vol. 15. No. 3. (No. 171). pp. 124–137.

This paper, with its appended tables, constitutes the report on the first year's employment of the ethyl esters of unsaturated fatty acids of chaulmoogra in the treatment of leprosy in Agua de Dios (Colombia). 700 patients have been under observation and treatment. The doses given varied from 1 to 15 cc., but experience has shown that 6 cc. is the maximum well tolerated in weekly injections. With larger doses untoward symptoms appeared, in particular dyspnoea, cough, laryngeal spasm and burning pain in the chest. Many patients have shown marked improvement both in their general state and in the local manifestations. The bacilli in the latter became fewer in number and fragmented. The authors find this preparation far more satisfactory than the oil itself or any of the derivatives hitherto tried. In the tables brief notes are given of 125 patients treated in different district hospitals, but, as the authors state, it is too early yet to expect very definite results.

H. Harold Scott.

i. SCHÖBL (Otto). **Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 533–542. [4 refs.]

ii. ——. **Chemotherapeutic Experiments with Chaulmoogra and Allied Preparations. II. Comparison of the Antiseptic Power of Chaulmoogra Oil with that of Other Vegetable and Animal Oils, Rare and Common.**—*Ibid.* 1924. Jan. Vol. 24. No. 1. pp. 23–27. [1 ref.]

i. This paper affords important confirmation and extension of the work of WALKER and SWEENEY on the action of chaulmoogra soaps on acid-fast bacilli in vitro in fluid media. Measured amounts of the oils were added to 10 cc. of 5 per cent. glycerine agar, which was then inoculated with a human tubercle bacillus, and the tubes were compared with control tubes after various periods of time to note any inhibition of growth, liquid paraffin and olive oil being added to other tubes for comparison. The tables show a specific action of the chaulmoogra oil of considerable degree, although less than WALKER claimed, while non-acid-fast bacilli were not inhibited by fifty times the amount of chaulmoogra oil that served to completely inhibit the growth of the tubercle bacillus. On comparing the effects of different oils of the chaulmoogra and allied species that of *Hydnocarpus wightiana* gave the greatest inhibitory power, *Taraktogenus kurzii* and *H. alcalae* came next, while *Gynocardia odorata* had no effect, not containing any of the chaulmoogric fatty acid series. Further, a sodium salt prepared from isolated hydnocarpic acid approaches in strength a soap of the total fatty acids, while the sodium salt of chaulmoogric acid is far below the soap of hydnocarpic acids in growth-inhibiting effect, as previously found by WALKER.

ii. The inhibitory effect of a large number of oils on the growth of tubercle bacilli on solid media is here dealt with, in a similar manner to the tests of chaulmoogra oils in the preceding paper, in concentrations not exceeding 0·5 per cent. of the culture medium. No less than forty-two oils, including vegetable, essential and animal oils, mostly found in the tropics, were investigated, and the results are arranged in a table to indicate the amount of oil added to 10 cc. of agar which produced inhibition of the culture. Three groups stand out, firstly the oils which inhibit acid-fast bacteria in comparatively small doses, with or without acting on non-acid-fast bacteria. The figures given as growth-inhibiting value express the relative strength of the inhibitory effect, 1 per cent. concentration being taken as a unit.

Of the chaulmoogra group *Hydnocarpus wightiana* showed the highest effect with a value of 100, 0·001 being the titre, against a value of 20 and a titre of 0·005 of *Taraktogenus kurzii* and *H. venenata, subfalcata* and *alcalae.* Of other oils *Cinnamomum zeylanicum* showed the remarkable result of being equal to *H. wightiana* against acid-fast bacilli and also against non-acid-fast bacteria, while the next highest effect against acid-fast bacilli only was shown by cashew nut oil [which was used externally in leprosy in South America several decades ago], namely a value of 10 and titre of 0·01, and the same results were got with vitiveria (*Andropogon zezanioides*), dacrydium and bergamot oils. Thus, although only the chaulmoogra group show high values against acid-fast bacilli, several other oils have an appreciable action on them.

L. R.

READ (B. E.). **A Chemical Study of the Comparative Values of the Ethyl Esters of Chaulmoogra and Hydnocarpus Oils.**—*China Med. Jl.* 1924. Jan. Vol. 38. No. 1. pp. 25–34. With 1 fig. [7 refs.]

This paper also deals with the comparative value of chaulmoogra and hydnocarpus oils investigated at the Peking Union Medical College. After a brief account of the advances of the last few years, it is pointed out that the Chinese variety of chaulmoogra oil is derived from *Hydnocarpus anthelminthica*, or Ta Feng Tzu, which is said to have been imported from Siam as early as 1590, is cheap and plentiful all over China, and can be supplied by Dr. MCKEAN, of Chien Mai, Siam, in large quantities. It is essential to obtain unadulterated oils, and that obtained by cold expression, which remains liquid at ordinary temperatures, is better than hot drawn oil. Chinese samples are often adulterated to the extent of 50 per cent., probably with soy bean oil. Taraktogenus and Hydnocarpus oils are regarded as of equal value, and also that of *H. anthelminthica*, known as lukrabo oil, 120 lb. of the seeds of which yielded 33·15 lb. of kernels, from which 7·4 lb. of oil was got by moderate pressure, the cost of the oil without labour coming to from 1 to 1·5 dollars. DEAN's method of preparing ethyl esters is next described, 10 lb. of the expressed oil yielding 4 litres of ethyl esters, which is about 17 per cent. more than is obtained from chaulmoogra oil. The molecular structure of the acids is next discussed, POWER's early work being quoted, and it is concluded that a low iodine value, other factors being good, indicates a greater percentage of chaulmoogric acid and activity. Pure ethyl esters give little or no pain on injection, the hydnocarpus esters being entirely painless. The suggestion is made that one part of the soap of chaulmoogric fatty acids incorporated in 5 to 10 parts of ordinary toilet soap would make a satisfactory toilet soap for the use of lepers, and that the ethyl esters prepared from *H. anthelminthica* are superior to those of chaulmoogra oil, while the low price of this common Chinese oil should make it of service to the medical profession in China.

L. R.

PERKINS (Granville A.) & CRUZ (Aurelio O.). **A Comparative Analytical Study of Various Oils in the Chaulmoogra Group.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 543–571. With 1 plate. [9 refs.]

This is an important but highly technical contribution to our knowledge of the composition of chaulmoogra, hydnocarpus and other closely allied oils, bringing out some practical points, and based on work in the chemical laboratory of the Culion Leper Colony. Both commercial samples of the oils and, where possible, the actual seeds from which the oils are extracted were obtained, including those of true chaulmoogra oil of the British Pharmacopoeia. *Taraktogenus kurzii*, seven varieties of Hydnocarpus, the most important of which are the Indian *Hydnocarpus wightiana* and the Chinese *H. anthelminthica*, which are very closely allied both botanically and in their chemical composition to true chaulmoogra oil, together with the oils of *Pangium edule*, which was incorrectly said by BRILL to contain the chaulmoogra series of fatty acids, were examined, and lastly *Gynocardia odorata*, which was confused for long with true chaulmoogra oil, although it also does not contain that series of fatty acids, these last two therefore

being unlikely to be of much value in leprosy treatment. Three of the other Hydnocarpus varieties are found in small limited areas of the Philippines and are not available in commercial quantities. A table is first given of the previously recorded chemical data on this subject; a brief description of the trees furnishing the oils follows, with the methods of extracting the oils, and the amounts obtained from the various seeds are tabulated, which in the case of the first grade oils from well preserved seeds varied from 8 to 38 per cent., but was much lower, 2 to 19 per cent., in second grade oils of a very dark colour from seeds which had not been properly dried and had consequently become rancid; a change which is especially common in that of *Taraktogenus kurzii*, while on the contrary the kernels of the seeds of *Hydnocarpus wightiana* retain a fresh odour, taste, and appearance for many months if kept fairly dry. [The latter are therefore likely to be of especial value orally in the nut form, without extracting the oil, as recently advocated in the case of *Taraktogenus kurzii* by E. A. O. TRAVERS in the Kuala Lumpur Leper Asylum (see above), and the seed can be obtained at a very low rate, about three shillings for 80 lb., from the Ernakalum Trading Co., Cochin, S. India.] Mouldy seeds, however, have a very low yield of oil. Optical rotation is the most characteristic property of the chaulmoogra group (including Hydnocarpus varieties), being as high as 45° to 50° against 2·8° to 16·9° in *Pangium edule* and nil in *Gynocardia odorata*. *Hydnocarpus* varieties, especially *wightiana*, give higher readings than Taraktogenus, so are probably slightly superior for medicinal use, although this can only be decided clinically. The iodine value, acidity, and freezing point of the fatty acids vary only slightly in the different oils, while determinations of the specific rotatory powers of the fatty acids indicated that the variations of optical rotation in the different oils is really due to differences in the composition of the fatty acid fraction, and not to any other constituent.

Fraction of the ethyl esters of several oils, to effect a partial separation of the mixed fatty acids, is next described and the properties of the higher and lower melting point acids are tabulated and their characters described. Very little difference was noticed between those of *Taraktogenus kurzii* and of *Hydnocarpus wightiana*, the two most commonly used oils in treatment, but the hydnocarpic acid fraction was definitely lower in the Chinese variety, *H. anthelminthica*, whose specific rotatory power is also low. The only hydnocarpus oil which differed much from the rest was *H. alcalae*, which contains a very large amount of chaulmoogric and little or no hydnocarpic acid, so is likely to be inferior in treatment, while the conclusion is come to that there is no reason for regarding Hydnocarpus oils in general as inferior therapeutically to true Chaulmoogra oil. The latter is more expensive and difficult to get and also more liable to deteriorate than that of *Hydnocarpus wightiana*. L. R.

STEVENEL. **Note préliminaire sur la découverte d'un principe actif dans l'huile de Chaulmoogra.**—*Bull. Soc. Path. Exot.* 1924. Jan. 9. Vol. 17. No. 1. p. 108.

In a preliminary note the writer claims to have discovered the active principle of chaulmoogra oil in the form of an unstable alkaloid, which kills lizards with symptoms like those of curare, but is less toxic to warm blooded animals such as rats. He thinks it may be the cause of giddiness after taking the oil, and that the principle is combined with the fatty acids. L. R.

SAMSON (José G.) & LIMKAKO (Gabino). **Preliminary Report on Creosote as an Adjuvant in Leprosy Treatment.**—*Philippine Jl. Sci.* 1923. Nov. Vol. 23. No. 5. pp. 515–527. With 2 text figs. [1 ref.]

MUIR uses creosote in combination with ethyl ester hydnocarpate in leprosy as an antiseptic, while its value in tuberculosis makes it possible that creosote may also have some direct action in leprosy. The writers have carried out careful tests to ascertain if this addition has such direct value, 194 patients being divided into four closely similar groups and given the following treatment :—

Group I.—53 cases, ethyl ester chaulmoograte intramuscularly.

Group II.—49 cases, ethyl ester chaulmoograte intramuscularly and creosote orally.

Group III.—43 cases, ethyl ester chaulmoograte intramuscularly, creosote and camphor (Muir's E.C.C.O. mixture).

Group IV.—49 cases, ethyl ester chaulmoograte intramuscularly and creosote, but no camphor.

Group II received 0·3 gram. of creosote in pill at each injection of E.E. chaulmoograte, the injections in all the groups being given twice a week. Group III had injections of a mixture of E.E. chaulmoograte 100 cc., creosote 25 cc., and camphor 25 grams. In group IV no camphor was used, but 12·5 cc. of creosote to 100 cc. of the ethyl esters were injected. The dose was increased by 1 cc. at a time up to the amount which could be tolerated without untoward local or general effects, and the relative amount of irritation to the tissues produced is shown by the fact that the average dose of the first two groups with the injection of ethyl esters alone was 3·8 and 3·7 cc., and of the last two groups only 3·1 and 3·2 cc. It was found that the addition of camphor lessened the irritant effect of the creosote, as while in Group III 20 per cent. of each could be used, in Group IV 20 per cent. of creosote alone was too irritating to be borne and the amount had to be reduced to approximately 11 per cent. The percentage of reactions was 4·3 and 5·9 per cent. in groups I and II, and 6·6 and 8·4 per cent. in groups III and IV, while the percentage of cases reacting were 54·7, 63·1, 76·7 and 73·5 respectively in the four groups, the reactions also having been more severe in the last two groups, which accounts for the smaller average doses tolerated by them, while in the first few creosote injections slight fever was noted, but not with later ones. On the other hand, the reactions produced by the creosoted preparations were milder than with the plain preparations, while they produced practically no exacerbations of the old lesions.

At the end of six months the results obtained were carefully worked out and classed as improved, stationary or worse, and showed distinctly greater (61 per cent.) improvement in the creosoted than in the plain preparations (51 per cent.). Group I showed only 43 per cent. improved and 8 per cent. worse, group II gave 59 per cent. improved and only 2 per cent. worse, Group III 58 per cent. improved but 14 per cent. worse, and group IV 71 per cent. improved and only 4 per cent. worse. The creosote groups gave the best results, while the addition of camphor appeared to do some harm, with the largest proportion of cases worse. Creosote was also found to stimulate the appetite, with increase in weight as well as in the improvement rate.

L. R.

RODRIGUEZ (José) & EUBANAS (Froilan). **Treatment of Leprosy with Antimony.**—*Philippine Jl. Sci.* 1923. Dec. Vol. 23. No. 6. pp. 575–594. [11 refs.], and *Monthly Bull. Philippine Health Service.* 1923. Mar. Vol. 3. No. 3. pp. 104–106. [5 refs.]

At the request of Dr. CAWSTON the writers have tried antimony in leprosy cases, as it had been reported by him to have given remarkable results in rapidly relieving paralysis, drying up ulcers and producing general improvement. Thirty advanced hospital cases were treated for six months with tartar emetic intravenously and twenty-two received antimony wine orally, and another twelve a modified Castellani yaws mixture for three months, the average duration of the disease being eleven years. Only an average of 0·0015 gram of tartar emetic a week intravenously or 0·252 gram. of vinum antimonale was borne, and no improvement was noticed in any group, the general condition on the whole being unfavourably affected, while six of the intravenous group and one other case died. In 25 per cent. of the survivors the ulcers improved as well as in 42 per cent. on the Castellani mixture, mostly in ulcers of nodules of short duration. In the intravenous group an outstanding feature was injury to the kidneys, and in the other group lepra fever. The low tolerance to the intravenous method in lepers is striking as compared with such diseases as kala azar, and is attributed to the great strain on the kidneys in advanced lepers with extensive skin disease and loss of sweating power. Some cases with complicating pulmonary tuberculosis appeared to be injuriously affected by the antimony treatment. They were, thus, quite unable to confirm the good results claimed by CAWSTON and supported by WILDISH, and although they were not able to try the proprietary preparation oscol stibium, they see no reason to think it is likely to prove more effective.

L. R.

MACKAY (James G.). **The Antimony and Sulphur Treatment in Leprosy.** [Correspondence.]—*S. African Med. Rec.* 1924. Apr. 12. Vol. 22. No. 7. p. 159.

Although the writer has "everything to say in favour of the ethyl esters of chaulmoogra oil," he thinks there is sufficient evidence to warrant the further and more wholesale use of antimony with sulphur as introduced by CAWSTON, so that this South African expert may be helped, and all the glory of the improved treatment not left to India. He records no personal experience of the method.

L. R.

HERXHEIMER (Gotthold). **Ueber die Leprazellen.**—*Virchows Arch. f. Path. Anat. u. Physiol.* 1923. Vol. 245. pp. 403–447. With 6 figs.

This is a very lengthy description of the anatomical and microscopical changes found in a case of nodular leprosy, with numerous references to the older literature. Naked-eye lesions were found only in the skin and naso-pharyngeal mucous membrane, not in the internal organs, where microscopically a few acid-fast bacilli were detected in the liver, spleen, and in the glands. Sections of the skin showed unchanged epithelial cells, and no excess of pigment. The cutis showed extensive leprotic infiltration with typical large cells containing numerous

bacilli, and staining with scarlet-red solution shows up clearly the lepra cells and demonstrates the characteristic lipoid material in them, as is illustrated by coloured drawings. Endothelial cells of small capillaries showed many separate bacilli, while in the large vacuolated cells masses of bacilli were found at the edges of the vacuoles; some of the organisms have degenerated and broken up into small red granules. The vacuolated cells with degenerated bacilli are not found in the internal organs. The bacilli can therefore more or less exist in all the cells of all parts of the body and increase undisturbed and with very little damage to the cells, but in these they are never found in large globular masses, but always as scattered well-developed rods of a saphrophytic nature in vessel or gland endothelium, which may be swollen, but are otherwise unaltered, and never show the vacuolation which is so typical of the large lepra cells of the skin lesions. These are derived from the reticulo-endothelial cells of the cutis, which alone show degenerative changes with vacuolation and massed bacilli, some undergoing degeneration. Thus these cells disintegrate the bacilli, but are themselves destroyed in the process with the formation of lipoid substance, whether derived from the capsules of the bacilli or not being doubtful.

References are next made to recent literature on the action of chaulmoogra oil and its derivatives, and the suggestion is made that previous treatment with this oil may account for the lipoid material found in the lepra cells. Lastly, the literature of animal experiments is dealt with, and stress is laid on the value of the findings of KYRLE in monkeys inoculated with masses of lepra bacilli in nodules, in some of which the tissues excised and examined showed vacuolated lepra cells containing masses of bacilli, some undergoing disintegration, as in skin lesions of human leprosy, indicating positive results of the experiment.

L. R.

LIMOUSIN (Henri). **Inoculation de la lèpre au lapin.**—*C.R. Acad. Sci.* 1924. Feb. 4. Vol. 178. No. 6. pp. 599–600.

A rabbit was inoculated with human lepra bacilli (from the nose of a leper) into the anterior chamber of the eye, with only temporary local reaction, but when killed after 22 months several nodules containing acid-fast bacilli were found in the lungs only.

L. R.

MAZZA (Salvador). **Phagocytose des bacilles de Stefansky dans le péritoine des rats et des cobayes.**—*Bull. Soc. Path. Exot.* 1924. Mar. 12. Vol. 17. No. 3. pp. 208–211. [3 refs.]

METCHNIKOFF showed that Koch's tubercle bacillus in animals is first phagocyted by polynuclear leucocytes, which in their turn become included in mononuclears uniting to form giant cells as shown by BORREL. The writer has found the same procedure to follow the intraperitoneal injection of Stefansky's rat-leprosy bacillus in animals within about eight hours, during which the polynuclears show degenerative processes.

L. R.

i. MORISSEAU. **Le dépistage de la lèpre au début.**—*Rev. Méd. et Hyg. Trop.* 1924. Jan. Vol. 16. No. 1. pp. 24–26.

ii. DOUGLAS (A. R. J.). **Control of Leprosy.** [Correspondence.]—*Brit. Med. Jl.* 1924. Mar. 8. p. 446.

iii. PRINGAULT (E.) & VIGNE (P.). **Les traitements recents de la lèpre.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre,* 1922. *Comptes Rendus.* pp. 130–136. [26 refs.]

iv. HAMZAH (Moehamad). **The Results of treating Leprosy with Thymol.**—*Trans. Roy. Soc. Trop. Med. & Hyg.*, 1923, Dec. 13. & 1924, Jan. 17. Vol. 17. Nos. 6 & 7. pp. 386–391.

i. The Negroes of the Upper Volta region, West Africa, who readily recognize the early signs of leprosy, look for discoloured patches on the body, pains on pressure over the distal phalanges, and a nodule in the testicle, and in choosing captives they avoid any showing these signs.

ii. A letter from Burma advocating segregation as of more importance than treatment in the control of leprosy. [It is not explained how the 100,000 census-returned Indian lepers, or the million believed by MUIR to be the true number, can be segregated, with the financial and administrative resources available.]

iii. This is a brief review of some of the recent literature regarding the treatment of leprosy, with a number of references, but no new material.

iv. This paper refers to the same work as a communication by the same author previously dealt with in this *Bulletin.* [Vol. 21, p. 182.]

L. R.

## REVIEW OF PELLAGRA LITERATURE.

With the passing of war conditions the occurrence of pellagra epidemics has apparently ceased. Having regard to the commonly accepted view as to the etiology of the disease this is not unexpected; indeed, it may be regarded almost as a further proof of the food deficiency theory. Nevertheless, the impetus given to pellagra research during the war is still manifest from the number of isolated cases described, especially in places where formerly the disease was rare, or altogether unknown.

A number of cases have been described in the British Isles. HUTCHINSON & PATERSON[1] report the disease as it occurred in two children. Both were little girls who had lived all their lives in England and in neither could any definite history of food-deficiency be traced. For some time prior to the first manifestations of the disease in both cases large amounts of cornflour had been consumed, but in one, at any rate, the protein was of sufficient amount and of high biological value. No mention of treatment is made, but one of the cases ended fatally, necropsy not being permitted.

Following this paper BIGLAND[2] reviewed the whole question of pellagra in the British Isles, and at the same time described another new case in Liverpool. The patient, a man aged 59, showed comparatively slight clinical signs, but the history was interesting. He lived alone in rooms, and having to prepare the meals himself he admitted that he frequently went without any food at all. This, together with the fact that the man was out of work and mentally confused, made it certain that his diet had been generally insufficient for some considerable time. The gastric juice contained no free HCl and the spinal fluid gave a luetic zone curve with the colloid gold test, though there was no other evidence of venereal infection. The author records other cases having similar spinal fluid changes, and the suggestion is made that a luetic zone curve in the absence of syphilis and disseminated sclerosis may be of diagnostic value.

It would appear that in certain British Asylums pellagra has become definitely endemic and in such every year a number of fresh cases are reported. WATSON[3] describes the outbreaks in the Lancashire County Mental Hospital, Rainhill. During the years 1913–1918 inclusive 36 definite cases were noted, though there were several others of "central neuritis" with all the features of pellagra excepting the rash. In 1919–1920 no further cases were reported and the survivors of previous years showed no recurrences. In 1921 there was only one case, but in 1922 a severe outbreak occurred, fourteen new cases being recorded. The majority of these had been in the Institution for a considerable time, and therefore the adequacy of the diet was carefully investigated. It was found that in 1922, the year of the severe outbreak, the diet was more generous and more varied than it had been in any previous year, even before the war. The reason for this outbreak remains, therefore,

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1 HUTCHINSON (Robert) & PATERSON (Donald). Pellagra in Children in England. —*Brit. Med. Jl.* 1923. Oct. 13. pp. 646–647. With 3 figs. [2 refs.]

2 BIGLAND (A. Douglas). Pellagra in the British Islands.—*Lancet.* 1923. Dec. 15. pp. 1295–1296. [28 refs.]

3 WATSON (G. A.). Pellagra.—*Ninth Annual Report of the Board of Control, for the Year* 1922. *Lunacy & Mental Deficiency.* pp. 74–76.

a mystery. In eight of the twelve fatal cases autopsies were made and the brain investigated with the greatest care. The most characteristic lesion found was a central neuritis without inflammatory reaction.

From Germany come reports of three cases, two in Berlin and one in Breslau. In the case described by BUSCHKE & LANGER[4] the patient, a woman aged 41, had lived for a considerable time prior to the commencement of the disease upon powdered maize given to her by a friend in a chocolate factory. She became inordinately fond of this and for the last few months she had eaten practically nothing else. The case ended fatally but the autopsy revealed nothing very abnormal.

GRUNENBERG[5] describes a case in a man, 45 years of age, in which the probable cause of the disease was a food deficiency due to achylia and progressive loss of appetite consequent upon chronic alcoholism and severe rectal haemorrhages. The patient was treated with picric acid solution (1 per cent.) given in doses of 1·5 cc. daily. The daily dose was taken in single drops spread over a period of three to six hours. No mention is made of recovery or otherwise.

FISCHER[6] prefers to call his case, occurring in a young servant girl in Breslau, "pellagroid," though the appearances described are fairly typical. Apparently the presence of advanced phthisis and recent syphilis complicated the issue. The patient had recently received 28 intravenous injections of salvarsan and the author mentions the possibility of arsenic poisoning, though he states that this is very improbable.

According to TYAU[7] pellagra up to the present had not been described as one of the diseases of China. Before March, 1923, no cases had been seen in Shanghai. Since then six cases, three of them fatal, have occurred. All were males over forty years of age belonging to the poor, working class. The author considers these six cases in detail. Unfortunately the photographs accompanying the article are so badly reproduced that it is difficult to discern the skin lesions, though there is no doubt that the disease is true pellagra. Rice was the staple food consumed by these pellagrins, and one would expect that if rice were a possible factor in the etiology the disease would be commoner than apparently it is. The author evidently realizes this, for he sounds a warning note to the medical men in China to be on their guard against the disease.

Another Chinese case is reported by WU[8], occurring in Wuhu. In this instance, the man, a poor boatman, lived only on rice and vegetables; occasionally he had fish but very rarely did he eat fresh meat.

In previous reviews the records of especially conducted researches upon etiology had a prominent place. At the present time such work appears to have come to a standstill. With the exception of the brief references to the possible causation of the particular cases already

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4 BUSCHKE (A.) & LANGER (Erich). Sporadisches Auftreten von Pellagra in Berlin.—*Klin. Woch.* 1923. Oct. 15. Vol. 2. No. 42. pp. 1921–1925. With 2 text figs.

5 GRUNENBERG (Karl). Ueber einen Fall von Pellagra.—*Med. Klin.* 1923. Oct. 14. Vol. 19. No. 41. pp. 1365–1367. [9 refs.]

6 FISCHER (Martin). Ein Fall von Pellagroid.—*Med. Klin.* 1923. Dec. 9. Vol. 19. No. 49. pp. 1606–1607.

7 TYAU (E. S.). Pellagra in Shanghai.—*Nat. Med. Jl. China.* 1923. Dec. Vol. 9. No. 4. pp. 272–279. With 5 text figs.

8 WU (S. C.). A Case of Pellagra in Wuhu.—*Nat. Med. Jl. China.* 1923. Dec. Vol. 9. No. 4. pp. 280–283. With 1 text fig.

described only two noteworthy papers have appeared. GOLDBERGER, WARING and TANNER[9] present a continuation of their previous experiments, which are now classical. The observations were made at three orphanages and also in a section of the Georgia State Sanitarium. Each of these institutions is an endemic focus of the disease. "The institution diet was in each instance modified by reducing the maize element and increasing the fresh animal protein foods—meat, milk (and, at the orphanages, eggs) and legumes." All other conditions remained unchanged. In all 702 individuals were kept under observation; of these 414 were pellagrins and 288 controls. "Among the pellagrins a single recurrent case was noted during the first year following the inauguration of the modified diet; none in the second nor in the third year. Among the non-pellagrins there was not a single case. At one of the institutions a return to the old diet was made, with the result that in a short time the pellagra incidence was about 40 per cent. among the affected group. Resumption of the modified diet over a further fourteen months brought about a complete disappearance of the disease. It will be admitted that there is justification for the authors' contention that "pellagra may be completely prevented by diet."

In another paper GOLDBERGER & TANNER[10] have continued their experiments in pellagra prevention with respect of substances other than meat. The effect of milk was studied in a sanitarium upon 29 coloured females, 19 of whom were pellagrins and 10 controls. In addition to the ordinary diet a daily ration of 40 fluid ounces of buttermilk was ordered. "None of the group of 29 patients developed any evidence of pellagra at any time during the observation period which, for 16 of the pellagrins and 9 of the non-pellagrins, lasted one year." Apparently ordinary milk is just as potent both for prevention and cure. Failure to prevent pellagra was noted when butter or codliver oil were tested in this respect. The amount of the former used in the experiment was a daily ration of 125–135 grams and of the latter 2 grams per kilo of body weight.

The infection theory enthusiasts have little to report. PAGE[11] claims to have isolated an organism from pellagra stools. The following characteristics are described :—"A gram positive, sporulating, actively motile bacillus; aerobic and slightly faculative anaerobic; non gas producing; grows at 37° C. and at room temperature; pellicle formation on bouillon; liquifies gelatin; digests Loeffler's blood serum. Does not ferment dextrose, lactose, saccharose or maltose; peptonsesi milk; conforms somewhat to those of organisms of the subtilis mesentericus group." The bacillus was isolated from the stools of 24 pellagrins and was not found in 10 control cases. The serum from pellagrins will not, as a rule, agglutinate the bacillus but the fluid obtained from blisters apparently possesses this power.

It is remarkable that those who lean to the microbic theory of pellagra do not pay more attention to the achlorhydria present in a large

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9 GOLDBERGER (Joseph), WARING (C. H.) & TANNER (W. F.). Pellagra Prevention by Diet among Institutional Inmates.—*Pub. Health Rep.* 1923. Oct. 12. Vol. 38. No. 41. pp. 2361–2368. [13 refs.]

10 GOLDBERGER (Joseph) & TANNER (W. F.). A Study of the Treatment and Prevention of Pellagra. Experiments showing the Value of Fresh Meat and of Milk, the Therapeutic Failure of Gelatin, and the Preventive Failure of Butter and of Cod-Liver Oil.—*Pub. Health Rep.* 1924. Jan. 18. Vol. 39. No. 3. pp. 87–107. [19 refs.]

number of the cases. When it is remembered that achlorhydria may be present for a considerable time prior to the onset of such conditions as pernicious anaemia and subacute combined sclerosis of the cord, and when the sore tongue in the former condition and the combined cord lesions in the latter are taken into account the possible causal connexion is, at least, suggestive. Perhaps the matter is worthy of further research.

The question of pellagra treatment at present is intimately connected with diet. GOLDBERGER & TANNER[10] selected eight moderately severe cases of the disease to which they gave a daily addition to their diet of 200 grams of lean steak. In all the cases clinical improvement followed. In four of the cases gelatin had been tried previously without result, an interesting observation which tends to support the view that certain amino-acid groupings are essential in the prevention of the disease. Buttermilk (48 ozs. per diem) gave fairly good results, but it was not as potent as meat.

PAGE[11] reports good results from the oral administration of Ichthyol gr. 5 or Copper arsenite gr. 1/100 three to four times a day.

A. Douglas Bigland.

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11 PAGE (B. W.). Etiology of Pellagra.—*New Orleans Med. & Surg. Jl.* 1923. Nov. Vol. 76. No. 5. pp. 245–247.

## NATIVE DIETARIES.

ADOLPH (William H.). **Diet Studies in Shantung.**—*China Med. Jl.* 1923. Dec. Vol. 37. No. 12. pp. 1013–1019. [4 refs.]

The author commences his work with the statement that "South China fed itself monotonously on rice and North China substituted wheat for rice and consumed it in the same monotonous way." In order to get more detailed information trained students were instructed during a summer vacation to keep accurate records of their own family's diet. In this way a dietary of twenty middle class Shantung homes was obtained. The individuals in these twenty families numbered 146 adults and 76 children. The figures recorded may be regarded as typical for the wheat districts of North China.

The investigation showed that "wheat and wheat-products far outbalanced the other food materials, and millet, beans and Kaoliang are also of considerable importance. Rice and meat do not figure in large amounts, and milk not at all."

The per capita fuel value of the diet amounts to 3,355 calories, of which 87 per cent. is derived from cereals. The average body weight of the Shantungese is about 60 kgm. and the work of the subjects of this study may be graded as "moderate muscular work." The Western allowance would be 3,500 calories. The food consumed is, therefore, just about sufficient to supply the needs of these families, but nothing more.

Of the 111 gm. of protein consumed per capita only 5·3 gm. are animal protein. This figure is to be contrasted with the Western diet in which about 50 per cent. of the protein is of animal origin. It must not be forgotten, too, that the figure 111 gm. represents only the protein consumed, and allowing for the poor digestibility of vegetarian diet the actual amount assimilated and metabolized must be considerably lower.

Another somewhat remarkable fact is that only 11 per cent. of the protein was derived from beans, and the author points out that in North China the diet could advantageously contain more Soy bean and less wheat.

A. Douglas Bigland.

ROXAS (Manuel L.) & COLLADO (Esteban G.). [In English and Spanish.] **A Preliminary Critical Study of the Filipino Diet. I. Estudio critico preliminar acerca de la alimentacion de los Filipinos. I.**—*Jl. Philippine Islands Med. Assoc.* 1922. July-Aug. Vol. 2. No. 4. In English pp. 171–185; In Spanish 197–211. [15 refs.]

Apparently the average Filipino diet is deficient. This is evidenced by the frequency of beriberi and the very high infant mortality rate. Investigations were carried out to discover the particular respects in which the diet of Los Banos families was deficient. The results show that protein is consumed in insufficient amounts, that vitamin carriers (vegetables and eggs) constitute only 4·1 per cent. of the diet and that there is a deficiency of calcium.

Rice forms 85 per cent. of the diet of the common people and, as McCollum has shown, this is deficient in four respects.—(1) Poor quality and quantity of its proteins, (2) Poor quality of its mineral salts, (3) The absence of vitamin A, (4) The absence of vitamin B.* To these defects the author adds another, viz., that rice is lacking in vitamin C.

For the correction of the protein, vitamin and calcium deficiency of the Filipino diet the liberal use of vegetables and milk is urged. In the fostering of dairy farming and vegetable growing lies the true solution of the problem.

A. D. B.

Das (Jahar Lal). **Some Observations on the Dietary of Scholars.**—*Indian Med. Gaz.* 1923. Sept. Vol. 58. No. 9. pp. 424–427.

The diet in the hostels attached to the High Schools of Bihar and Orissa was made the subject of careful study. Investigations proved that the diet was deficient in proteins, fats and vitamins though the carbohydrate and caloric values were fairly satisfactory. The essentials of the diet were dal (pulses) and bhat (boiled rice). The defects were apparently pointed out to the authorities and tables were drawn up showing how the diet could be rendered efficient with due regard to the cost of the food.

Unfortunately there is no record of the bad effect, if any, of the deficient diet upon the health of the scholars.

A. D. B.

Barrowcliff (M.). **The Vitamins.**—*Fifth Congress Far Eastern Association of Tropical Medicine. Singapore, September, 1923.* 7 pp. 1923. Kuala Lumpur: Printed at St. John's Press.

A brief résumé of the history of vitamins is given, and towards the end of his remarks the author makes the following statement:—

> The diet that produces beriberi in the few can hardly fail to have a deep-seated and bad physiological effect on the many, and ocular evidence in native settlements of probable malnutrition in the form of affection of the eyes and skin is rarely far to seek. In consideration of this and recollecting the extent to which the European in the tropics has often to subsist upon canned foods and milk, with relative absence of salads and green stuffs, it seems not unlikely that some at least of the evils ascribed to the climate may be due really to the food.

A. D. B.

Findlay (George Marshall). **A Preliminary Note on the Destruction of Vitamin B by Age.**—*Biochemical Jl.* 1923. Vol. 17. No. 6. pp. 887–890. With 5 charts. [3 refs.]

Samples of Indian lentils and peas kept for thirty-eight years were investigated for the presence of vitamin B. It was found that a small amount of the vitamin had been lost but appreciable quantities still remained. The seeds had lost the power of germination. These results are of interest as regards the survival of vitamin B for a very long period of time.

A. D. B.

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* This must refer to polished rice.

McCarrison (Robert). **Pathogenesis of Deficiency Disease. XIV. On the Occurrence of Ophthalmia in Pigeons fed exclusively on Parboiled Rice and on its Prevention by the Addition of Soil to the Food.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 323–335. With 3 charts.

Parboiled rice from the Kistna District of the Madras Presidency was found to cause polyneuritis columbarum only in exceptional cases. Autoclaving the rice and thus destroying the vitamin B was responsible for the development of polyneuritis. Though the parboiled rice could prevent polyneuritis it could not prevent ophthalmia. From these findings it would appear that in those districts where the rice is parboiled ophthalmia should be more common than beriberi, while the converse should be found where the rice was not parboiled before milling. This assumption is supported by the following facts :—

"In the Tanjore District of the Madras Presidency, where the almost universal practice is to use parboiled rice, beriberi is practically unknown, whereas the hospital reports show the number of cases attending for eye disease during the year 1920 to be 118 per million. In the Kistna District, where raw milled rice is in almost universal use, beri-beri is common, eye diseases less so ; the number of cases attending hospital for the former during the year 1920 being 153 per million, for the latter 55 per million."

The author found that garden soil, freed from rootlets as far as possible, contained some substance which gave protection against the ophthalmia caused by eating parboiled rice. This substance is probably vitamin A but possibly some unknown allied body.

A. D. B.

## HELMINTHIASIS.

BRUMPT (Émile). **La migration des helminthes. Leur importance dans la pathogénie du cancer. Rôle des animaux domestiques et sauvages dans la prophylaxie des maladies parasitaires.**—Conference faite à la Société de Médecine et Chirurgie de Rio de Janeiro, le 20 Septembre 1922, et écrite spécialment pour la "*Folha Medica.*" 10 pp. 1922. Rio: Canton & Beyer. Rua Luiz de Camões, 74.

In an address to the Society of Medicine and Surgery of Rio de Janeiro, Professor Brumpt reviewed the part played by helminths, as revealed by recent researches, in inducing disease and the protective rôle assumed by certain of the domesticated and wild animals in the prophylaxis of parasitic maladies. The migrations followed in the normal host may be similarly followed in vicarious hosts, but in the latter case the larvae do not attain to maturity. Auto-infection with *Strongyloides vituli* of cattle produced local oedema, but intestinal infection did not become established. The researches of FIBIGER on the production of neoplasms by *Gongylonema neoplasticum*, and BORREL's studies on the association of malignant growths with the presence of *Cysticercus fasciolaris*, suggest that possibly cancerous growths in man may have had their origin in migrating helminths which died long before the clinical diagnosis had been arrived at. As possible factors in zooprophylaxis of helminths the water-buffaloes in Egypt are quoted as playing an important rôle by attracting innumerable cercariae shed into the water by infested molluscs.

R. T. Leiper.

NICOLL (William). **Remarks on the Pathogenicity of Common Intestinal Worms.**—*Lancet.* 1924. Jan. 26. pp. 174–176. [4 refs.]

A stimulating paper, urging the claims of helminthic infections on the attention of the general practitioner, who hitherto has been inclined to relegate this matter to the domain of tropical medicine. It is not the author's intention to record any new work in the field of helminthology, in which he has already made a name, but to point out that from the medical side enteritis and severe diarrhoea, cutaneous disturbances (probably of toxic origin analogous to serum rashes), atypical febrile attacks, anaemia of varying degree, pneumonic conditions, and, from the surgical aspect, biliary obstruction, appendicitis or a symptom-complex simulating appendicitis, may all arise from worm infections.

He proposes publishing a bibliography containing the more important clinical records in recent years in this connexion.

H. Harold Scott.

SIGALAS (R.) & PIROT (R.). **Un nouveau procédé d'enrichissement en coprologie.**—*C.R. Soc. Biol.* 1924. Mar. 28. Vol. 90. No. 11. pp. 755–757.

Among the chief objections to most methods of examining faeces for helminth ova are that much time is occupied if examination of several direct smears is made, and even then a negative finding is no proof of absence, or that special apparatus or materials are needed which are often difficult to obtain abroad, and that only a small portion of the

stool is submitted to examination. The authors here describe a method by which the stool is first broken up by shaking in a 300 cc. flask with 100 cc. of water containing some 30 large glass beads. The resulting mass is then filtered through a metal screen with wide meshes (an ordinary gas-fire screen will do). The filtrate is collected in a large glass and after sedimentation has taken place the deposit is taken up with saturated salt solution (S.G. 1185 or thereabouts), turned into a cylindrical tube, which is then filled to the top, covered with a glass slide and left for 24 hours undisturbed ; the ova are then readily seen. [The authors state that their method differs from that of BASS, but they make no mention whatever of Clayton LANE's work and method, of which this is clearly a crude adaptation.]

H. H. S.

ISBECQUE (G.). **Recherche d'anticorps spécifiques chez les porteurs de Vers intestinaux.**—*C.R. Soc. Biol.* 1924. Mar. 21. Vol. 90. No. 10. pp. 691–692. [1 ref.]

The author submitted to the complement fixation test sera from 25 individuals ; of these 8 were harbouring Ascaris, 6 Trichuris, 3 were infected with both, and 8 were uninfected controls. For Ascaris antigen he used *Ascaris equorum* prepared by the method of WEINBERG and PARVU, and carried out the test by using 0·5 cc. antigen and the same volume of the patient's serum, varying the complement dose. Seven of the eight fixed from 2·5 to 7 doses of complement ; the eighth, which proved negative, was a child suffering also from tubercular peritonitis. The sera of those infected with both worms fixed from 3 to 12 doses of complement. Fixation in Trichuris cases was found in only three of the six and these in low titre (2–3 doses). Of the controls one fixed a single dose of complement, the remaining seven none at all, so that all the controls may be regarded as negative. [These records are of great interest, seeing that the results obtained by previous workers have been very uncertain and inconstant.]

H. H. S.

LEIDY II (Joseph). **The Hemotoxins of Intestinal Parasites. A Critical Summary with Notes on Some Cases.**—*Jl. Parasit.* 1924. Mar. Vol. 10. No. 3. pp. 147–152. [21 refs.]

Anaemia associated with the presence of intestinal worms cannot be adequately explained by blood-abstraction and is probably the effect of a haemotoxin. The opinions of several investigators are quoted in this regard and the author gives a brief account of three cases of his own. In the first, a girl of 12 years, obstinate corneal ulceration and malnutrition led to the diagnosis of tuberculosis. There was an eosinophilia (14 per cent.) and ascarides were passed as a result of a dose of santonin, after which the symptoms rapidly cleared up. The second was a boy of 9 years, suffering from eczema, occasional epistaxis, and malnutrition ; the third was a boy of 5 years, diagnosed as suffering from angioneurotic oedema. Both of these also recovered promptly after expulsion of ascarides. The paper contains no new facts but serves to impress once again the importance of faecal examination of children and adolescents with anaemia and malnutrition.

H. H. S.

JANICKI (Constantin). **Une théorie nouvelle sur la morphologie générale des Trématodes et des Cestodes.**—*C.R. Soc. Biol.* 1923. Dec. 22. Vol. 89. No. 37. pp. 1340–1341.

The Trematode and Cestode organism comprises two portions, (*a*) the body and (*b*) the caudal segment. This division is especially notable in the *Monogenea* or ectoparasitic Trematodes. In the Digenetic Trematodes the caudal segment is only represented by the transient larva. This is also the case in the Cestodes, where it corresponds to the tail of the cysticercoid, the cyst wall of the cysticercus and the rudimentary caudal appendage of the precercoid of the bothriocephalid worms. The fundamental unity of the trematodes and cestodes is seen only in transitory stages, and has been replaced in the course of phylogenetic development by a different organization acquired secondarily owing to the influence of endoparasitism.

R. T. L.

KACHI (Giheida) & TASHIRO (Suyekichi). [**Contributions to the Experiment on the Inefficient Method of Collection of Parasites' Eggs in Feces.**]—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1923. Nov. Vol. 30. No. 6. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 37.]

The authors draw attention to the fact that at times helminthic ova may be found by examination of direct smears of the faeces although not seen after centrifugation. They explain this as being due to the eggs floating in an upper layer of the fluid in the tubes. [No mention is made as to the nature of the fluid employed, but seeing that the floatation method is based on the specific gravity of the menstruum their explanation is probably correct.]

H. H. S.

GREENWAY (Daniel). **Un caso extraordinario de asociación parasitaria intestinal.** [An Unusual Case of Multiple Intestinal Parasitism.]—11 pp. With 8 figs. 1923. Buenos Aires: "Las Ciencias." Libreria y Casa Editoria de A. Guidi Buffarini. 845, Junin.

An account is given of a soldier, 21 years of age, whose only complaint was of fatigue and headache. Blood examination showed a reduction of red cells to 3,430,600 per cmm., haemoglobin 55 per cent., and an eosinophilia of 14 per cent. Examination of the faeces revealed the presence of the following: *Necator americanus, Ancylostoma duodenale, Strongyloides stercoralis, Oxyuris vermicularis, Trichuris trichiura, Hymenolepis nana,* and fly-larvae.

H. H. S.

DAY (H. B.). **Anthelminthic Work in Egypt.**—*Lancet.* 1924. Mar. 1. pp. 435–437. [8 refs.]

This is a further report upon the success of the "annexe" method of treatment of helminthiasis adopted in Egypt. In addition to that at Kasr-el-Aini Hospital, Cairo, there are now five other annexes established in the larger towns. Over 50,000 patients were treated during 1923. To bilharzial cases tartar emetic is administered intravenously, the initial dose being 1 gr., the maximum 2 gr., and the total 22½ gr. in twelve doses during a period of four weeks. Only 2–4 per cent. of patients require more than this. The cause of failure is usually insufficient treatment, the patients ceasing to attend when symptoms are relieved. One instructive case is detailed. To this patient fifteen injections, totalling 28½ gr., were given in ten weeks.

At the end of this time examination of the urine revealed three dead ova; five weeks later three living and twenty-five dead ova; five months after ceasing treatment 200 living ova were counted. This shows that it is necessary to maintain a sufficient concentration of the drug in the circulation for three to four weeks to kill the adult worms.

Emetine in similar doses for the same length of time was given to (1) Young children, or those with veins too small or inconspicuous for intravenous medication; (2) Cases of intestinal schistosomiasis complicated by amoebiasis; (3) Those intolerant of antimony; (4) Those with advanced hepatic or renal disease. At the end of the course living ova might still be seen, but these disappeared subsequently, and further examination five months later revealed none, showing that emetine has a cumulative effect and kills both worms and ova.

Patients suffering from ankylostomiasis are treated with carbon tetrachloride in doses of 3–5 cc. followed two hours later by a purge, or with oil of chenopodium, two gelatin capsules followed 1½ hours later by a third, each containing 0·5 cc. A week later, if ova are still present, the treatment is repeated, the patient during the interval taking iron and arsenic in mixture or pill. As a rule two treatments with carbon tetrachloride or three with oil of chenopodium suffice to expel practically all the worms.

H. H. S.

GOEBEL (F.). **Die Behandlung der Wurminfektion.** [Treatment of Helminth Infections.]—*Klin. Woch.* 1924. Mar. 11. Vol. 3. No. 11. pp. 453–456. [58 refs.]

On such a comprehensive subject as this space will permit of our mentioning only those drugs which have been recently introduced. For ankylostomiasis, in addition to oil of chenopodium, thymol, and carbon tetrachloride, the author mentions a preparation of Bayer's, *Isotin*, recommended by JAGER in doses of 2 gm. of the powder thrice daily after meals for 5 days. For Ascaris, three new preparations are spoken of: (1) *Wermolin* (containing oil of chenopodium and castor oil) in two doses, each of 5–15 gm., given in milk at an interval of 1–2 hours, for children of 3 to 12 years of age, a purgative being given 2 hours after the second dose. (2) *Helminal*, a dried extract of *Digenea simplex*, in tablets, one to three being given thrice daily for 3 successive days. If ova are still present in the stools eight days afterwards the course is repeated. (3) *Santoperonin*, favourably reported upon for all worm infections. The dose for Ascaris is not stated, but tablets of 1·5–3 cgm. are given with meals three times a day for a week for Oxyuris.

In the treatment of Oxyuris infection the ends to be kept in view are the avoidance of re-infection by preventing scratching at night and by careful cleansing of the fingers and the nails; clearing the large intestine of worms; killing off the young in the lowest part of the small intestine [the author believes in the direct development of the worms at this site]. For eradication new preparations mentioned are three from Aluminium subacetate: *Eston* tablets, *Gelonida aluminium subacetate*, and *Oxymore* (made by interaction of benzoic acid and the basic acetate). Also *Cupronat*, a copper albumin compound, and *Bulotan* (p-Oxydiphenyl-methan). Santoperonin has been already spoken of.

For Taenia two new preparations of *Filix mas* are recommended: *Tritol III*, in which the taste of the fern is masked by malt extract,

and *Filmaron*, 0·2–1 gm. according to age. In conjunction with 9 parts of castor oil Baehringer produces this last under the name of *Filmaronol.* Other drugs for the treatment of Taenia which receive mention are *Sebirol*, made from the peel of "*Musenna abessynica*," and *Taeniol*, a combination of the last with thymol and salicylates.

H. H. S.

MHASKAR (K. S.). **A Note on the Reliability of Post-Treatment Diagnoses of Helminth Infections.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 743–747. [1 ref.].

A series of tables indicate that oil of chenopodium has a toxic action upon hookworms and roundworms which causes a suspension of ovulation lasting to the 12th day after treatment. The effect in the case of betanaphthol, thymol, carbon tetrachloride and santonin is more fleeting and does not extend beyond three days.

These observations indicate that the search for ova in the stool may be relied upon for diagnosis if made after the 4th day but only after the 12th day where chenopodium has been used.

R. T. L.

GRANDSOULT (G. A.). **Carbon Tetrachloride and Oil of Chenopodium in Helminthiasis.** [Memoranda.]—*Brit. Med. Jl.* 1924. Feb. 23. p. 319.

The treatment of helminthic infections in the Georgetown Public Hospital, British Guiana, is recorded, the chief parasites being *Ancylostoma duodenale, Strongyloides intestinalis, Ascaris lumbricoides* and *Trichuris trichiura.* 3 oz. of a saturated solution of sodium sulphate are given in the evening and 40–60 minims of carbon tetrachloride the following morning; on the third night after this another 3 oz. of the sodium sulphate solution. About 40 per cent. of cases cease to pass ova. The author states that carbon tetrachloride is more effective when combined with oil of chenopodium than when taken alone, but gives no details as regards the combined method. Of three cases mentioned in more detail only one had both drugs and this patient had previously undergone two months' treatment with the carbon tetrachloride alone.

H. H. S.

CHEINISSE (L.). i. **Les précautions à prendre dans l'emploi de l'huile de chenopodium.**—*Presse Méd.* 1924. Mar. 1. Vol. 32. No. 18. pp. 193–194. [8 refs.]

——. ii. **Le tétrachlorure de carbone comme anthelminthique.**—*Ibid.* Mar. 8. No. 20. pp. 214–215. [14 refs.]

i. Five cases are recorded in which toxic effects followed the taking of oil of chenopodium; four of them terminated fatally, the main symptoms being vomiting, giddiness, deafness, convulsions and coma. One of the five passed a single worm, none of the others passed any, nor were they found at the autopsies. In every instance large doses had been given and the author very rightly lays stress upon three points:—1. To make sure that worms are present, for vermicides and vermifuges are often given either because the parents think that the

child is harbouring worms, or because the symptoms complained of are obscure and something has to be done. 2. To avoid excessive dosage. In one of the cases detailed, a child of 5 years was ordered 20 drops three times a day. The dose recommended is one drop for each year of the child's age, two such doses being given in the day with an interval of one or two hours. 3. Since the drug is supposed to act by merely "stupefying" and not killing the worms, it is essential that a purgative be given soon after the second dose, and, if this does not act well, it should be repeated. The fact is pointed out that oil of chenopodium is particularly effective in Ascaris infection, uncertain with Oxyuris, useless for Taenia. For Ancylostoma it is good, but carbon tetrachloride is better.

ii. This paper gives a brief general review of carbon tetrachloride as an anthelminthic, calling attention to the facts that it is more efficacious for male *Necator americanus* than for the female of that species or for *Ancylostoma duodenale*, and that alcoholic subjects show an undue susceptibility to its toxic action. The whole constitutes a short summary of present-day knowledge of the drug but records nothing new.

H. H. S.

LE NOIR & DESCHIENS (R.). **Action anti-parasitaire du carbonate de bismuth à doses massives dans certaines infestations vermineuses ou à protozoaires du tube digestif.**—*Arch. des. Malad. de l'Appareil Digestif et de la Nutrition.* 1923. Nov. Vol. 13. No. 9. 7 pp.

Oral administration of bismuth carbonate in massive doses has been recommended for oxyuriasis by LOEPER. The authors have tested its effect on roundworms and tapeworms of cats, dogs and mice. They conclude, from a somewhat limited range of experiments, that there is a strong antiparasitic action on certain nematodes but that the cestodes, lacking alimentary tract, are uninfluenced by the drug.

R. T. L.

GUERRERO (Luis E.) with the collaboration of SISON (A. B. M.), MAKALINTAL (A.), VILLASEÑOR (P.), ROSAL (I.) & OCAMPO (A.). [In English and Spanish.] **Niyogniyogan (*Quisqualis indica* L.) as an Anthelminthic. Niyogniyogan, *Quisqualis indica* L., como Anthelmintico.**—*Jl. Philippine Islands Med. Assoc.* 1924. Mar. Vol. 4. No. 3. In English, pp. 83–87. In Spanish, pp. 109–111.

*Quisqualis indica* has for many years been held in high repute among the natives of the Philippines as an anthelminthic. DE LA PAZ made a pharmacological study of the drug but could not prove that it had any such property. The authors, therefore, treated 11 patients, 7 children and 4 adults, infected with Ascaris. The dose for children was one seed for each year of age, and for adults 12–20 seeds, triturated with syrup of acacia and given for two successive evenings, followed by a purgative the next morning.

Six of the children passed Ascarides, but only one of the adults. In all of them ova persisted in the faeces. Further trial is needed to decide whether the drug is of real value.

H. H. S.

CAWSTON (F. G.). **Distribution of Snails serving as Intermediate Hosts of Flukes in South Africa.**—*Parasitology.* 1924. Jan. Vol. 16. No. 1. pp. 67–68.

This brief paper records some of the findings made by the author during his examination of South African molluscs for cercariae. Examples of *Isidora forskali* were obtained from Amanzimtoti, Isipingo, Clairwood, Umhl-a-tazana, Cato Manor, Inchanga station, Umgeni, Tongaat, Nonoti, Umzindusi, at Pietermaritzburg, Lourenço Marques, and Beira. Amphistomes have been found in this mollusc but the author's attempts to rear the adult worms experimentally in animals have failed. The sheep liver-fluke *Fasciola gigantica* develops in *Limnaea natalensis* and *Physopsis africana.* "Schistosome" cercariae have been found by the author occasionally in *Physopsis africana, Isidora tropica, I. forskali, I. globosa, Limnaea natalensis, Planorbis pfeifferi* and *Segmentina planodiscus*; most of these schistosome cercariae are not identical with those of the schistosomes infecting man. Of four styletted cercariae found the author writes, "one of which occurring in the Durban water-cress is suspected of being *Paragonimus westermani*, the lung-fluke of the Far East." [An unsupported and unwarranted statement which the author has made in previous papers.]

R. T. L.

LANE (Clayton). *Gastrodiscus hominis.*—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 27–32. [11 refs.]

The author returns once more to the discussion of the validity of *Gastrodiscoides* as a genus distinct from *Gastrodiscus.* He deals with four characters :—1. The large genital cone. 2. The position of the genital orifice. 3. The smoothness of the ventral disc. 4. The localization of the testes. Those who have examined specimens have recorded differently as regards the presence of the genital cone. STEPHENS and Clayton LANE found none, LEIPER and KHALIL regard it as a special feature. This aspect of the question is disposed of in the paper under review in the following somewhat cryptic sentence: "No matter how often a genital depression may be absent, its authenticated presence eliminates it inevitably as a valid generic character." The second point—the relative position of the genital pore to the edge of the ventral disc—is regarded as invalid because the relative position of the margin of this disc itself is not constant and the position of the pore in relation to internal structures, in particular the oesophagus, varies amongst the species of the genus *Gastrodiscus.* The third point is the nature of the surface of the ventral disc. The smoothness or roughness of this is said to be due to muscular contraction and, if this be definitely proved, all will agree with the author that change of shape induced by muscular contraction and relaxation does not constitute a valid foundation on which to differentiate genera. Lastly, the position of the testes. This is stated to vary in appearance according to methods of examination and is thus also a feature not to be relied upon as a generic character.

H. H. S.

MAURY (E.) & PÉLISSIER (R.). **Obstruction du cholédoque par douve du foie.**—*Presse Méd.* 1924. Mar. 8. Vol. 32. No. 20. pp. 213–214. [8 refs.]

A woman, 43 years of age, had suffered for ten years from repeated attacks of what was considered to be biliary colic. These attacks becoming more violent and more frequent after February, 1922, and the patient having lost nearly a stone in weight in the ensuing three months, an operation was undertaken in May for removing the supposed gall-stone. None was found, but the bile duct was seen to be dilated and from it a specimen of *Fasciola hepatica* was removed. All the symptoms disappeared and the weight was rapidly regained. The remainder of this paper consists of a summary of previously recorded cases.

H. H. S.

DUGA. **Un kyste sous-hépatique dû à** *Fasciola hepatica.*—*Ann. de Méd. et de Pharm. Colon.* Paris. 1923. Sept.-Oct.-Nov.-Dec. Vol. 23. No. 3. pp. 358–359.

At the Yaounde Hospital, a native girl 8 years of age had a sub-hepatic cyst the size of an orange. On puncture a serous liquid was found to contain eggs of *Fasciola hepatica.* After operation many adult flukes were evacuated.

R. T. L.

NAKAGAWA (Koan). **The Development of** *Fasciolopsis buski,* **Lankester.** —*Jl. Parasit.* 1922. June. Vol. 8. No. 4. pp. 161–166. With 3 plates. [2 refs.]

The chief facts communicated in this paper have already appeared in *Kitasato Arch. Experim. Med.* (1921) (see this *Bulletin,* Vol. 19, p. 215). There are, however, more complete descriptions of the developmental stages, and three plates give valuable illustrations of these and of the freshwater molluscs *Planorbis coenosus* and *Segmentina largillierti* which have been shown to act as intermediate hosts in nature. Experimental infections were carried out in the dog and pig. Although the Fasciolopsis is not uncommon in pigs in Formosa no cases have been discovered of its occurrence in man in this region. [This, with the absence of *F. buski* from pigs in the Shaohing endemic region on the Chinese mainland, opens up several interesting problems.]

R. T. L.

NAKAGAWA (Koan) & SUZUKI (Sotowo). [**Studies on the Development of** *Fasciolopsis buski.* **II Communication.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1923. June. No. 2334. [Summarized in *Japan. Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 276.]

In an earlier communication the pig was thought to be the only animal in which *Fasciolopsis* infection could be experimentally induced and in which the worm reached maturity. Further experiments show that the worm lived for one month in the dog, two months in the rabbit and for ten days in the guineapig.

R. T. L.

LAL (Shiam Manohar). **A Case of** *Fasciolopsis buski* **Infection.**—*Indian Med. Gaz.* 1923. Dec. Vol. 58. No. 12. pp. 586–587.

A brief note records the finding of ova of Fasciolopsis in a Hindu male admitted to Bulandshahr District Hospital complaining of dysenteric symptoms and the recovery of hundreds of adult flukes after treatment with eucalyptus and chloroform.

R. T. L.

SUZUKI (Satowo). [**On the Resistance of the Encysted Cercaria of** *Fasciolopsis buski.*]—*Taiwan Igakkwai Zasshi (Jl. of Formosan Med. Soc.).* 1923. Mar. No. 227. [Summarized in *Japan Med. World.* 1924. Jan. 15. Vol. 4. No. 1. p. 15.]

The encysted cercaria of *Fasciolopsis buski* dies in 1½ hours in a 20 per cent. solution and in 3 hours in a 5 per cent. solution of salt. They have a resistance comparatively greater than the egg to outside influences. For preventive measures it would be best to boil all infested vegetables or keep them in salt solution.

R. T. L.

ANDŌ (Ryō). [**Morphologische und biologische Untersuchung ueber die Zerkaria von** *Paragonimus westermani.*]—*Chug. Ij. Shp.* Tokyo. 1921. Vol. 41. pp. 286–297. With 1 fig. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. pp. 60–61.]

According to the abstract the original article contains 5 chapters :—(1) Deals with the intermediate host, *Melania libertina* ; (2) gives an account of the rediae of cercariae in the body of Melania ; (3) recounts the animal experiments relating to infection with these cercariae ; (4) describes the biology of the cercariae, with special reference to their powers of resistance to outside temperature, to their vitality in water, and to the influence on the cercariae of digestive juices, body fluids and chemicals ; (5) embodies the conclusions. These are :—(*a*) Cold and warm blooded animals, which had been infected with cercariae obtained from Melania by feeding, intravenous injection or transference into stomach, all gave negative results, so that a second intermediate host appears essential for the further development of the cercariae. (*b*) The cercariae are very resistant against cold, but only slightly so against heat. (*c*) The cercariae live for a long time in tap water and in pond water. (*d*) The cercariae soon die in artificial digestive juices, soda solutions and bile, thus showing that infection through the digestive tract does not easily take place. (*e*) The cercariae are immediately killed when transferred to 1 per cent. sublimate solution, 1 per cent. carbolic acid solution, 1 per cent. formalin solution and human urine. From these facts prophylactic and defensive measures may be inferred. (6) The cercaria can live for a long time in Rock's solution, Ringer's solution and blood plasma, which shows that they can complete their development only after having passed through the bodies of Melania and fresh water crabs.

R. T. L.

ANDŌ (Ryō). [**Beiträge zur Kenntnis der Lungendistomiasis.**]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 450–451. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 60.]

Investigations on the problem whether any haemolytic substance could be separated from the lung distome always proved negative. An immunity against fresh infection was shown in cases which had been parasitized by adult worms. This immunity, however, was not transmissible to the young.

R. T. L.

ANDŌ (Ryō). [**Ueber die hämolytische Wirkung von** *Paragonimus westermanii.*] [The Haemolytic Action of *P. westermanii.*]—*Chug. Ij. Shp.* Tokyo. 1921. Vol. 41. pp. 708–724. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 60.]

The writer has shown that the lung fluke itself, the excreta of the animals as well as the tissues involved, *e.g.*, the cyst and the tissues surrounding it, etc., show no haemolytic reaction on the red blood cells of patients suffering from lung flukes, of syphilitics, of healthy people, or of healthy dogs or those suffering from lung flukes.

R. T. L.

ANDŌ (Akira). [**Studies on the Therapeutic Treatment of Pulmonary Distomiasis.**]—*Iji-Shimbun* (*Med. News*). 1923. July. No. 1121. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 277.]

Administered intravenously in a solution of 1 per cent. to 3 per cent., calcium chloride has proved very efficacious in lessening the recurrences of haemoptysis and in reducing the number of the eggs expelled.

R. T. L.

ICHIMIYA (Ittoku). [**On the Geographical Distribution of Paragonimiasis in Keishyo-Hokudo in Korea.**]—*Okayama Igakkwai Zasshi* (*Jl. Okayama Med. Soc.*). 1923. Dec. No. 407. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 40.]

Of more than 11,000 persons examined in the Keishyo-Hokudo district of Korea 6·12 per cent. were found to be infected with *Paragonimus westermanii.* The first intermediate host, *Melania*, is common and the inhabitants are said to eat them boiled; the second hosts, *Eriocheir* and *Astacus*, were seen in the brook running through the villages, and the natives are fond of eating these, either raw or only partly cooked; hence the infection.

H. H. S.

KOBAYASHI (Harujiro). [**Studien ueber** *Paragonimus westermanii* **in Korea.**]—*Mitt. Med. Hochsch.* Keijo. 1921. Vol. 4. pp. 5–17. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 60.]

The first intermediate host of *Paragonimus westermanii* is some species of *Melania.* The miracidia of Paragonimus develop in the first host to sporocysts in which the primary rediae are formed, and in these the daughter rediae develop. The encysted larvae in the second host are not set free, but are generally passively transferred into the body of the final host when this intermediate host is eaten raw.

R. T. L.

MIYAIRI (Keinosuke). **Beiträge zur Kenntnis von der Entwickelung des** *Paragonimus westermanni.*—*Mitt. a. d. Med. Fak. d. Kais. Kyushu-Univ.* Fukuoka. Japan. 1922. Vol. 6. No. 2. pp. 313–319. With 4 plates & 1 fig.

The author summarizes his investigations on *Paragonimus westermanii* covering a period of ten years. The first intermediaries are *Melania paucicincta* and *M. extensa.* The eggs hatch in from 17 to 30 days. The optimum temperature is 30° C. The development of the miracidium to the sporocyst redia and the resulting styletted cercariae with knoblike tail are described. Microphotos of the snails, the developmental stages, and the prawn, *Astacus japonicus*, which can act as the second intermediate host, accompany the brief text.

R. T. L.

WAYSON (N. E.). **An Investigation to determine whether Clonorchiasis may be disseminated on the Pacific Slope.**—*Amer. Jl. Trop. Med.* 1923. Nov. Vol. 3. No. 6. pp. 461–473. [22 refs.]

The author reports that *Clonorchis sinensis* occurred in 5 out of 5,775 Japanese and 315 out of 3,701 Chinese wishing to enter San Francisco. There is a high potential danger of the introduction of this infection to the United States. Experiments failed to incriminate the snails native to local waters although these include species of the same group of molluscs known to convey the disease in China. Moreover, carp which might function as a second intermediary also abound. The rivers of the Pacific slope, which are fed by snow-covered Sierras, have rapid and short courses, and their waters are cold throughout much of the year, and low temperatures are known to inhibit the development of trematode larval stages. These three factors, absence of species actually concerned in transmission and low temperatures make the spread of the fluke in America improbable, and this risk is further diminished by the disposal of human excrement and the infrequency of the consumption of raw fish by Europeans.

R. T. L.

NATIONAL MEDICAL JOURNAL OF CHINA. 1923. Dec. Vol. 9. No. 4. pp. 342–343.—**Noted Authority favors Lifting Ban on Chinese with Clonorchiasis.**

This is a letter written to the China Club of Seattle by Professor E. C. FAUST pointing out that Chinese persons infested with Clonorchis need not be excluded on that account from the United States, since the dangers of extension of clonorchiasis in America are negligible owing to the absence, or comparative absence, of the first intermediate host—Melania. [It may be noted, however, that *Schistosoma haematobium* occurs sporadically in India and in Portugal, where Bullinus spp. are absent. It does not follow that Clonorchis is limited in its potential distribution to the regional distribution of the genus Melania.]

R. T. L.

SHATTUCK (George Cheever). **Results of Treatment for Clonorchiasis. Preliminary Report.**—*Amer. Jl. Trop. Med.* 1923. Nov. Vol. 3. No. 6. pp. 475–494. [22 refs.]

Three Chinese immigrants infected with Clonorchis were treated with intravenous injections of tartar emetic, but the results were not very encouraging. One was apparently cured after a total of 19·5 gr. had been given in 52 days. The second was treated for 97 days, the total quantity being only 20 gr., as the patient showed intolerance ; the ova did not diminish in numbers, in fact they seemed to increase, nor did they show any alteration in appearance. Three doses of arsphenamine subsequently given at intervals of a week, totalling 1·1 gm., were followed by negative findings from two days after the last dose. The third patient was given 30·25 gr. of antimony tartrate in 44 days and took the drug well, but ova still continued to pass unaltered in any way.

H. H. S.

FAUST (Ernest Carroll). **A Preliminary Note on the Life History of *Clonorchis sinensis* in Chekiang Province, China.**—*Amer. Jl. Hyg.* Baltimore. 1924. Jan. Vol. 4. No. 1. pp. 69–71.

In Chekiang Province of China, clonorchiasis is not a serious human infection, but it is very prevalent in cats. A species of *Melania* was found to harbour the larval stages and the ocellate cercaria was shewn to encyst in fishes not only of the Cyprinidae but also of unrelated families. The scaling of fish for human consumption and the consequent removal of the encysted cercariae which are attached to the scales explains probably the relatively slight infestation of man as contrasted with that of cats in the region investigated.

R. T. L.

KOBAYASHI (Harujiro). [**On Clonorchiasis in China.**]—*Chosen Igakkwai Zasshi* (*Jl. Chosen Med. Assoc.*). 1923. Apr. No. 42. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 279.]

The author deals with the results of his investigations in Shanghai, Kaochao, Soochow, Hankow, etc. The fish which act as the second intermediate host [not specifically mentioned in the English abstract] abound in the Yangtze-Kiang River.

R. T. L.

KUWAHARA (Shōsaburo) & MŪTO (Masatomo). [**Ueber die Immunität von Leberdistomiasis.**]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 447–449. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1921. Vol. 1. No. 1. p. 59.]

Complement fixation investigations were carried out on patients and animals suffering from liver distomiasis in order to demonstrate the existence of immunity. Investigations on recent or light infections were negative, whereas in old infections they were distinctly positive. The author is inclined to support the idea that immunity occurs.

R. T. L.

TOYAMA (Gunpei). [**Ueber den Blutbefund bei Leberdistomiasis.** Blood Changes in Hepatic Distomiasis.]—*Okayama Ig. Kw. Z.* 1921. pp. 384–407. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 59.]

In liver distomiasis the anaemia never becomes severe and it has been less studied than that due to other parasitic diseases. Leucocytosis is practically absent. Eosinophilia is absent or only slightly present. Pathological red cells are rarely seen. There is no definite relation between the intensity of infection, the number of eggs and the changes in the blood. An emulsion of liver distomes and an alcoholic extract of urine from patients suffering from liver distomiasis exert no special reaction on the erythrocytes of the rabbit.

R. T. L.

CIUREA (J.). **Heterophyidés de la faune parasitaire de Roumanie.**—*Parasitology.* 1924. Jan. Vol. 16. No. 1. pp. 1–21. With 5 plates. [43 refs.]

This paper is of importance to those interested in the classification of the trematode family *Heterophyidae.* The author subdivides the family into five subfamilies, viz.:—(1) *Heterophyinae*: genus

*Heterophyes*; (2) *Metagoniminae*: genus *Metagonimus*; (3) *Centrosestinae* [*Centrocestinae*]: genera *Centrocestus*, *Ascocotyle* and *Pygidiopsis*; (4) *Apophallinae*: genera *Apophallus* and *Rossicotrema*; (5) *Cryptocotylinae*: genera *Cryptocotyle*, *Scaphanocephalus*. He is of opinion that the genus *Paracoenogonimus* Katsurada should be excluded from the family, for KATSURADA's species *P. oratus* is simply a holostome of the genus *Prohemistomum*, but he restores *Scaphanocephalus*, excluded by RANSOM, and shows that RANSOM's genus *Cotylophalus* 1920 is a synonym of *Rossicotrema* 1919. *Cryptocotyle lingua* of America is not identical with that of Europe and is named *C. americana*; the south American species of *Ascocotyle* recorded by FARIA does not appear to belong to the species *A. minuta*. In an interesting section the author discusses the identity of the flukes reputed to parasitize both mammals and birds (viz., *Ascocotyle minuta*, *Apophallus mühlingi*, *Cryptocotyle lingua* and *C. americana*) and agrees with LOOSS that the problem will only be satisfactorily settled when the complete life-histories have been traced. The paper contains many new observations of value to the systematist.

R. T. L.

KHALIL (M.). **The Source of Infection with** *Heterophyes heterophyes* **in Egypt.**—*Lancet.* 1924. May 10. p. 952.

This brief note summarizes the results already published in the *Journal of Helminthology* (see this *Bulletin*, Vol. 20, p. 937) of feeding kittens with infected Egyptian mullet (*Mugil cephalus*) in which KOBAYASHI had also reported the encysted cercariae of *Heterophyes*. Four hours after feeding, cercariae freed from their cysts were recovered from the small intestine. After twenty-four hours the genital organs of the parasites could be differentiated. In seven days many of the worms contained ova, although smaller than normal. Those recovered on the 14th day had attained normal adult size. The infection of the mullet is of interest, as it is a salt-water fish found only occasionally in the Nile estuary and frequenting the salt-water lake Manzalah, near Port Said.

R. T. L.

CHRISTOPHERSON (J. B.). **Longevity of Parasitic Worms: the Term of Living Existence of** *Schistosoma haematobium* **in the Human Body.**—*Lancet.* 1924. Apr. 12. pp. 742–743. [4 refs.]

It is related of a case of urinary bilharziasis contracted in the Northern Transvaal in 1878, that 28 years later the patient, a graduate of medicine and well versed in the microscopic examination of urine, found in his urine ova which gave rise to live miracidia. Several of the cases of bilharziasis contracted during the Boer war were passing live eggs after 18 years. The author assumes that the presence of living miracidia in the ova give an indication of the length of life of the adult worms.

R. T. L.

BASSETT-SMITH (Percy). **Naval Medical History of the War. Section of Tropical and Sub-Tropical Medicine. Part VII. Bilharziasis.**—*Jl. Roy. Nav. Med. Serv.* 1924. Jan. Vol. 10. No. 1. pp. 40–42.

Only four cases of bilharziasis appear to have been noticed among the naval ranks and ratings landed in Egypt, none in Natal or Mesopotamia. Brief notes are given of these. In one it is of interest to note that pus and blood occurred in the urine after a cure with antimony, ova could not be found in the urine, but tubercle bacilli were always present. This tubercular cystitis was a secondary condition supervening upon the bilharzial infection.

R. T. L.

BOULAY (A.) & LEGER (Marcel). **Evaluation de la quantité de sang rendue par l'urine dans un cas de bilharziose vésicale.**—*Bull. Soc. Path. Exot.* 1923. Jan. 10. Vol. 16. No. 1. pp. 63–65.

For estimation of the amount of blood passed in the urine of a patient suffering from *S. haematobium* the authors determined the iron in the haemoglobin. 100 cc. of a 24 hours' mixed urine is treated with chlorate of potassium and hydrochloric acid to destroy the organic matter. The resulting fluid is oxidized by boiling after addition of nitric acid. The volume is made up to 100 cc., and 10 cc. of a 5 per cent. solution of ammonium sulphocyanate is added. The colour obtained is compared with that given by the addition of one-tenth of its volume of the same solution of ammonium sulphocyanate to 0·1 gm. per litre of iron in the ferric state. The quantity of the iron in the urine of this case was 0·033 gm. per litre. Since, normally, 1 gm. of Fe represents 263 gm. haemoglobin, there were 8·68 gm. per litre of urine. There being 15 gm. per cent. of haemoglobin in normal blood, the blood content of the urine of the patient was $\frac{8{\cdot}68 \times 100}{15} = 57{\cdot}86$ gm. This patient passed 2,300 cc. urine in the day and the loss of blood, therefore, amounted to 133 gm.

This was a low estimate because, owing to the anaemia, the haemoglobin was probably nearer 10 than the normal 15 gm. per cent., and the authors state that the patient was losing approximately 175 gm. of blood in 24 hours. Estimations could not be carried out for successive days because treatment with tartar emetic was begun early, and the results were so successful that blood was no longer visible to the naked eye after a few days and the patient was discharged cured 12 days after commencement of treatment.

H. H. S.

LE BAS (Geraldine Z. L.). **A Note on the Employment of *Fasciola hepatica* as an Antigen for the Serum Diagnosis of Bilharziasis.**—*Proc. Roy. Soc. Med.* (Sect. of Trop. Dis. & Parasit.). 1924. Jan. Vol. 17. No. 3. pp. 6–10. [15 refs.]

Diametrically opposed findings have been recorded by various workers with antigens of helminthic origin. The author, from a study of three cases, states that "Alcoholic extracts of *Fasciola hepatica* are capable of fixing complement in a greater degree with sera from persons infected with schistosomes than with normal sera" [but the tables inserted to illustrate this do not lend much support to the contention, for only when the maximum quantity of antigen was employed was

any difference noted at all with sera from two patients infected with *S. haematobium*]. With an absolute alcohol extract one serum gave ————, another +———, while with a 90 per cent. alcohol extract the former gave +++— and the latter ————, the difference between a 3 plus and a 4 minus being apparently due to the extraction being made with 90 per cent. in place of absolute alcohol. With a *S. mansoni* serum, again with the maximum amount of antigen, +——— was given with an absolute alcohol extract and ±——— with 90 per cent. This test, therefore, would not be of any value for diagnostic purposes, especially as the tables show further that syphilitic sera may have a far stronger fixation power than those of patients suffering from schistosomiasis. This fact is further supported by the author's final conclusion that alcoholic extracts of helminthic and molluscan tissues very often give Wassermann antigen. A third conclusion which appears to bear out the above is worded thus : " *Schistosoma mansoni* infection superadded to syphilis gives no greater degree of fixation than is accounted for by the degree of fixation due to the capability of the serum for fixing complement in the presence of a Wassermann antigen."

H. H. S.

CAWSTON (F. G.). **The Prevention of Bilharziasis.** [Correspondence.] —*Lancet.* 1923. Dec. 22. pp. 1376–1377.

Though the common mollusc hosts of schistosomes soon die in a dry tropical climate, some can survive for 48 hours in the shade under conditions of moist heat. Operculated snails can remain alive for several weeks, but the writer records that a non-operculated snail, Barnupia, has great powers of resistance to drying owing to its close attachment to reeds. Hence, although complete drying of pools for a few days at a time will kill the mollusc hosts of *S. haematobium* and *S. mansoni*, this plan will not succeed in all cases of non-operculated snails nor for the host of *S. japonicum*. [The suggestion of drying was made solely as a means of Bilharzia prophylaxis in Egypt. R.T.L.]

H. H. S.

LANGERON (Maurice). **Troisième Mission parasitologique en Tunisie. Recherches sur les cercaires des piscines de Gafsa et enquête sur la bilharziose tunisienne (septembre-octobre 1920).**—*Arch. Inst. Pasteur de Tunis.* 1924. Apr. Vol. 13. No. 1. pp. 19–67. With 28 text figs. [34 refs.]

An investigation of the molluscan fauna of the thermal springs of Gafsa revealed only *Melanopsis doumeti*, *M. tunetana* and *Melania tuberculata*—none of which have been implicated in the spread of bilharziasis. Detailed descriptions are given of the various developmental stages found in these molluscs. The absence of suitable intermediaries or of developmental stages of schistosomes in the local molluscs forces the author to conclude that bilharzia infection is not acquired by bathing in the thermal springs of Tunis. The *Bullinus brocchii* found in the irrigation channels would appear to be the probable source of the infection.

R. T. L.

ANDERSON (Ch.) & GOBERT (E.). **Des mesures prophylactiques applicables contre la bilharziose en Tunisie.**—*Arch. Inst. Pasteur de Tunis.* 1924. Apr. Vol. 13. No. 1. pp. 125–128. [1 ref.]

Prevention of bilharziasis is an important question for Tunis. The vesical type is extremely prevalent. *Planorbis philipii* is present but there is no coincidence between its distribution and that of *Schistosoma mansoni*, for this is unknown in Tunis. The numerous foci of *Bullinus* (*B. contortus*, *B. dybowski*, *B. brocchii*) coincide with the endemic centres of *S. haematobium*. The author considers the various methods by which the intermediary in Tunis might be brought under control and advocates a method on the lines suggested by LEIPER for Egypt, where the scientific utilization of the periodical rotations of government controlled water might result in the eradication of the molluscs by drying.

R. T. L.

ANDERSON (Ch.) & GOBERT (E.). **Note relative à la prophylaxie de la bilharziose en Tunisie.**—*Bull. Soc. Path. Exot.* 1924. Jan. 9. Vol. 17. No. 1. pp. 35–37. [2 refs.]

After speaking of Professor LEIPER'S work in Egypt the author considers how the measures suggested in that country may best be applied to Tunis. *Schistosoma haematobium* is the only species common there, and the cycle of infection is best broken at the molluscan stage. A system of cleaning and filling of pools and canals is recommended as the most practicable preventive measure.

H. H. S.

MAËS (Eugène). *Schistosoma haematobium* **au Soudan français; enquête sur la bilharziose vésicale dans le cercle de l'Issa-Ber (Boucle du Niger).**—*Ann. Parasit. Humaine et Comparée.* Paris. 1924. Jan. Vol. 2. No. 1. pp. 82–85.

Vesical bilharziasis is very prevalent in French Soudan. Of 200 cases investigated in the region of Issa-Ber 127, *i.e.*, 63·5 per cent., gave evidence of infection with *S. haematobium*. The intermediary concerned there has not been implicated yet.

R. L. T.

DOLBEY (Robert V.) & FAHMY (Ibrahim). **Bilharzial Papillomatosis of the Rectum.**—*Lancet.* 1924. Mar. 8. pp. 487–488. With 1 fig. [2 refs.]

Though tartar emetic will destroy the ova of *Schistosoma*, the papillomatous condition set up and the distressing symptoms resulting therefrom continue. Complete and permanent cure is only obtained by excision of the whole tube of affected rectal mucous membrane. The operation has been performed on eight cases by one or other of the authors, as much as 17 inches being removed in one instance. The muscular coat is left intact and the mucous membrane above the excised part is drawn down and sutured to the margin of the skin and external sphincter. In only one case was there any after-trouble; in this the tension was so great that the sutures gave way, retraction of three inches resulted and a troublesome stricture developed. Even children of 10 and 12 years of age were operated upon and the results

were very good. As there is a considerable degree of shock and haemorrhage patients with severe anaemia should not be submitted to operation.

H. H. S.

CHRISTOPHERSON (J. B.). **The Treatment of Bilharzia Disease.**—*S. African Med. Rec.* 1923. Dec. 22. Vol. 21. No. 24. pp. 566–568.

The author calls attention in this paper to some points of special interest in the treatment of schistosomiasis, particularly by antimony tartrate. He shows that 79 per cent. of unselected cases are cured by a full course. He regards as "cured" a patient who a year after cessation of treatment shows no symptoms of the disease—no live ova, no haematuria. A few dead ova may be still passing and thus a few red blood corpuscles may be present. By a "full" course he implies 4–5 weeks' treatment, and a total of 30 grains of the drug. Cases should not be recorded as "failures" because a shorter course and a smaller amount have not proved effectual. As compared with emetine the author thinks that the former is undoubtedly preferable, since emetine, in addition to giving a smaller percentage of cures, "is more dangerous, more expensive, and more objectionable to the patient."

H. H. S.

CHRISTOPHERSON (J. B.). **The Curative Dose of Antimony Tartrate in Schistosomiasis (Bilharzia Disease).**—*Brit. Med. Jl.* 1923. Dec. 29. pp. 1254–1255.

The author explains the reason for continuing the treatment of patients infected with schistosomes until a full course of tartar emetic totalling 30 grs. has been given, in spite of the disappearance of symptoms and apparent cure. The number of worms present is usually great and they differ in individual susceptibility to antimony; many will be killed by less than the full amount, but the more resistant may merely suffer a temporary reduction of their activities and recover if treatment ceases. Patients should, therefore, not be regarded as "cured" unless on examination the urine is free from live ova a year after cessation of treatment, nor, on the other hand, should treatment be said to have "failed" if ova return after an interval when the full dose has not been given (30 grs. intravenously, during 4–5 weeks).

H. H. S.

CAWSTON (F. G.). **The Treatment of Bilharzia Disease in the Young.**—*Jl. Trop. Med. & Hyg.* 1924. Apr. 1. Vol. 27. No. 7. pp. 73–74.

Intravenous administrations of antimony to children is at times a difficult procedure, even when special needles are used, and in some places abroad a continuous supply of these is not always obtainable. The author, therefore, made trial of emetine intramuscularly, starting with gr. $\frac{1}{4}$ and, when larger doses were reached, combining this with sparteine to counteract the depressant effect of the former on the heart. Children can rarely tolerate doses higher than $\frac{2}{3}$ gr. The course given extended over a period of 24–26 days, and the total amount given was, in nearly every case, the same number of grains as the years of the child's age. At the end of a week many degenerating ova were

seen ; during the second week a few living ova, very few in the third week, and, as a rule, none in the fourth, provided the treatment had been maintained.

H. H. S.

ZIEMANN (Hans). **Zur Antimon (Stibenyl)-Therapie bei einigen tropischen Krankheiten.** [Bilharziasis.]—*Deut. Med. Woch.* 1924 Feb. 1. Vol. 50. No. 5. p. 136.

A sketchy account is given of the use of Stibenyl in certain tropical diseases. Two cases of urinary schistosomiasis, one quite mild, rapidly improved after successive doses of 0·1, 0·2 and 0·3 gm. administered intravenously. In two patients suffering from subtertian malaria and in three with *Loa loa* no benefit was obtained.

H. H. S.

DAVIES (L. W.). **Bilharziosis—Cases of.**—*Nigeria Ann. Med. & San. Rep. for the Year 1922.* pp. 32–33.

The author treated 14 patients, whose ages varied between eight and seventeen years, suffering from urinary schistosomiasis, with tartar emetic ; the maximum dose was 2 grains and the total 12–14 grs., administered intravenously except in two instances where, owing to difficulty in entering the vein, he gave 5–7 grs. dissolved in distilled water on alternate days per rectum. The total amount thus administered is not stated, but the treatment was continued " for a fortnight or so " by which time the ova were disintegrated.

H. H. S.

CAWSTON (F. G.). **Destroying the Bilharzia in its Various Stages.** [Correspondence.]—*S. African Med. Rec.* 1924. Mar. 8. Vol. 22. No. 5. pp. 111–112.

A somewhat fanciful comparison is drawn between the cleansing of infested rivers and the curing of patients infected with *Schistosomum haematobium.*

H. H. S.

GRUBER (Gg. B.). **Klinisch-pathologische Beiträge zum Gebiet der Urologie. Ueber Harnblasen-Bilharziosis.** [Bilharziasis of the Bladder.]—*Ztschr. f. Urol. Chirurg.* Berlin. 1923. Vol. 13. pp. 99–102. With 2 text figs.

A man, aged 24 years, who had served in Palestine during the war, was taken into hospital on account of haematuria. By cystoscope a flat, warty tumour with a raw but not ulcerated surface was seen, which bled readily, and close to it was a small nodule which, it was thought, might be tuberculous. The part affected was excised and the patient made a good recovery. A detailed description is given of the morbid histology of the excised portion which proved to be a papillomatous growth due to *S. haematobium.*

H. H. S.

MELENEY (Henry Edmund). *Schistosomiasis japonica* : **Egg Deposition and the Subsequent Pathology in the Intestines of Experimentally Infected Dogs.**—*Proc. Soc. Experim. Biol. & Med.* 1924. Feb. Vol. 21. No. 5. pp. 270–272. [1 ref.]

From the study of the pathology of experimentally infected dogs killed in 28 to 65 days after infection two hitherto unnoticed features are described :—

On the 29th day after infection nearly all the deposited eggs occurred in the stroma of the mucosa : a few were in the submucosa. In many cases all the eggs were within distended venules and capillaries. At this stage there was no haemorrhage and practically no tissue reaction. The copulating worms were in distended veins in the submucosa.

In sections of dogs killed 40 to 65 days after infection abscesses had developed about the eggs in all the coats of the intestine and there was a tendency to proliferate into abscesses in the submucosa. In the dog at the 65th day some of these abscess cavities were completely lined with intestinal epithelium and the contents discharged through the lesions of the glands. It is probable that this epithelial proliferation into the submucosa is an important factor in the formation of intestinal papillomas.

R. T. L.

KASAMA (Yoshiaki). [**Experimentelle Untersuchung ueber die durch vitale Erscheinung von** *Schistosomum japonicum* **hervorgerufenen pathologischen Veränderungen.** Investigation of the Pathological Changes induced in the Tissues by the Presence of *S. japonicum.*]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 463–465. [Summarised in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 62.]

The author performed experiments on rabbits by infecting them through the skin with cercariae of *Schistosoma japonicum* obtained from a specimen of *Blanfordia nosophora* with the object of trying to find in how far the well-known pathological changes of this parasite are due not to the deposited schistosome eggs, but to vital changes in the adult itself. In these experiments the cercariae always developed into one sex in the host.

In these animals thus protected from egg deposition fairly marked changes were seen in the liver, spleen, kidneys and thyroids. The author concludes that the cirrhotic liver changes, which YAMAGIWA says are due to interstitial hepatitis arising from embolism, are caused not only by egg deposition but also, to some degree, by vital processes of the parasite. The experimental results lead the author to suggest that it would be better to call it hepatic cirrhosis due to *S. japonicum.*

R. T. L.

KASAMA (Yoshiaki). [**Ueber das Darmkarzinom bei** *Schistosomiasis japonica* ; **zugleich eine genetische Beziehung zwischen seiner Entstehung und den Parasiteneiern.** Intestinal Cancer in Schistosomiasis Japonica ; Generic Relation between its Origin and the Schistosome Eggs.]—*Gann.* Tokyo. 1921. Vol. 15. pp. 159–228. With 1 fig. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 49.]

Intestinal carcinoma is found more often among the inhabitants in regions where schistomiasis is endemic. The nine cases of intestinal

carcinoma examined were all adenocarcinomatous. In the intestinal tissue many old parasite eggs were found, especially between the malignant and healthy tissue. Several times heterotopia and transitional forms of the intestinal epithelium becoming tumour cells were seen. The author assumes that the cancerous formation from the adenomatous growth is the nature of a heterotopic glandular epithelium. The parasite eggs appear to affect the glandular epithelium as foreign bodies as well as by their metabolic changes.

R. T. L.

KAWAMURA (Rinya) & KASAMA (Yoshiaki). [**Ueber die rachitische Knochenveränderung bei den an** *Schistosomiasis japonica* **erkrankten jungen Kaninchen und Kindern.** The Rachitic Changes in the Bones in Young Rabbits and in Children infected with *S. japonica.*]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 465–466. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 62.]

The author examined the rachitic bone changes in three young rabbits, all from different mothers; the mothers had previously been strongly infected subcutaneously with cercariae of *Schistosoma japonicum.* In development these were much behind the controls. Typical rachitic changes were seen, *e.g.*, the rachitic "rosary" at the junction of the bone and cartilage of the ribs, and a thickening of the epiphyses at both extremities. Histologically the tissue was typically rachitic. In every case the thyroid and genital glands were atrophied and with impaired function while the hypophysis was always hypertrophied.

Although no parasites were found in the portal system in the above cases it is supposed that the toxin of these worms passed to the young *in utero* through the placenta, and after birth by the milk.

R. T. L.

SUEYASU (Yoshio). [**Ueber die Beziehung zwischen** *Schistosomiasis japonica* **und der Feldratte.** *S. japonicum* Infection and the Field Rat.]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 467–470. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 61.]

In his first communication the author had shown that natural infection with schistosomes occurs in field rats in endemic centres, thus helping to spread the disease; further, he advocated the destruction of these rats as an essential for prophylaxis. He is now able further to support his view. In the earlier investigations 5 out of 10 field rats harboured schistosomes, while in his later series 5 out of 65. This difference is explained by the fact that the first rats were caught in a heavily infected region, whereas the latter were caught in an endemic centre where disinfection with lime had previously been carried out; this incidentally also serves to show the value of lime in stamping out the disease. Since on the other hand Dr. NAKAMATO has found a schistosome infection in the weasel, the writer has increased the scope of his recommendations by advocating the extermination of weasels and other field mammals, in addition to field rats, if the disease is to be stamped out.

R. T. L.

SUEMORI (Susumu). [**Studien ueber das** *Schistosomum japonicum* **in Formosa.**]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 458–459. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 63.]

According to the author's researches there is no real difference between the schistosome worms of Formosa and old Japan. There is only a biological characteristic revealed in the fact that the worms do not parasitize the indigenous population.

Infection experiments showed that animals infected with cercariae from a single intermediate host became parasitized by worms of one sex only, whereas those treated with cercariae from two or more intermediate hosts developed both male and female worms. Where worms of only one sex resulted, the parasites showed differences in the development of the body from those resulting from infections in which there were both sexes of worms present.

R. T. L.

MENGERT-PRESSER (Hilde). **A Case of Schistozomiasis Japonicum.**—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1923. Part 3. pp. 227–235. With 6 plates. [19 refs.]

The findings of a post-mortem examination on a Chinaman in Weltevreden (Batavia) are recorded in some detail. These were indicative of tuberculosis, but subsequent microscopical examination showed large numbers of ova of *S. japonicum* in the vermiform appendix and in the liver. Giant cells were present in the kidney, spleen, and other organs where no ova were seen, but whether these were due to tuberculosis or not was not proved.

H. H. S.

ISOBE (Michi). [**Biological Observation of the Cercaria of** *Schistosomum japonicum.*]—*Taiwan Igakkwai Zasshi* (*Jl. of Formosan Med. Soc.*) 1923. Mar. No. 227. [Summarized in *Japan Med. World.* 1924. Jan. 15. Vol. 4. No. 1. p. 15.]

The range of temperature of the water required to induce the emergence of the cercaria of *S. japonicum* from its intermediate host was found to be 18°–35° C. Neither water nor light seemed to have any influence but darkness appeared to favour emergence.

R. T. L.

SUYEYASU (Yoshiwo) & NAKAMOTO (Hyakusuke). [**Supplementary Notices on the Prevention of** *Schistosomiasis Japonica.* **Practical preventive Work in the Infected Region in Bingo. (Concluded).**]—*Chugwai Iji Shimpo* (*Internat. Jl. Med.*). 1923. Aug. No. 1041. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 276.]

The following points are noted by the authors as of practical importance in the prevention of Asiatic schistosomiasis in Japan.—(1) Prohibition of use of cattle, (2) keeping of human manure for a considerable period before use, (3) destruction of intermediate host by chalk, etc., (4) improvement of irrigation, (5) instruction to inhabitants. [No details are given in the English summary.]

R. T. L.

KAWAMURA (Rinya) & KASAMA (Yoshiaki). [**Ueber die Heterotopie der Darmepithelien bei Schistosomiasis des Kaninchens.** Heterotopia of Intestinal Epithelium in Schistosomiasis of the Rabbit.]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 510–513. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. I. No. 1. p. 50.]

Intestinal changes with special reference to heterotopia of the intestinal epithelium were studied in a rabbit which had been experimentally infected by immersion in water containing schistosome cercariae. There were marked changes such as epithelial heterotopia, adenomatous and papillomatous growth of the mucosa but none of a malignant character.

R. T. L.

YOSHIDA (Sadao) & OGATA (Seiji). **Two Rare Specimens of Human Cestodes.**—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 15–22. With 1 fig. & 1 plate. [2 refs.] Also *Osaka Igakkwai Zasshi* (*Jl. of Osaka Med. Soc.*) 1923. Dec. Vol. 22. No. 12. [*Summarized in Japan Med. World.* 1924. Mar. 15. Vol. 4. No. 3. p. 74.]

*Dibothriocephalus parvus* was originally recorded by STEPHENS from Persia. In 1915 Dr. LEON reported a case in Roumania. The authors describe a specimen from a boy age 9, in the city of Himeji, Japan. The strobila is without head and measures 2·315 metres in length having 1,150 proglottides. The original differentiation of the species was based on external characters, especially on the size of the worm and of the egg. These are not always sufficient to distinguish species but the authors incline to accept them in this case. The latter part of the paper deals with abnormalities in *Dibothriocephalus latus.* The fenestrated abnormality is probably caused by the disintegration of the uterine portion of the segment and the fusion of adjacent fenestrations with each other.

R. T. L.

SCOTT (H. Harold). **A Contribution to the Experimental Study of the Life-Histories of** *Hymenolepis fraterna* **Stiles, 1906, and** *Hymenolepis longior* **Baylis, 1922, in the Mouse.**—*Jl. Helminthology.* 1923. Dec. Vol. 1. No. 5. pp. 193–196. With 1 plate. [8 refs.]

It has been assumed that the cysticercoids found by MINCHIN in the rat flea *Ceratophyllus fasciatus* were possibly those of *Hymenolepis longior.* The author relates a series of careful feeding experiments which demonstrates conclusively that the cysticercoids of *Hymenolepis longior* like those of *Hymenolepis nana* develop in the intestinal mucosa of the mouse and that the mouse becomes infected directly through their liberation by the bursting of the villi in which they grow. Two excellent microphotos illustrate the paper.

R. T. L.

WOODLAND (W. N. F.). **On the Life-Cycle of** *Hymenolepis fraterna* (*H. nana* **var.** *fraterna* **Stiles) of the White Mouse.**—*Parasitology.* 1924. Jan. Vol. 16. No. 1. pp. 69–83. [11 refs.]

This paper is an amplification of the preliminary note on the life-history of *Hymenolepis fraterna* published in *Nature* (1923. Sept. 22. Vol. 112, p. 436), and gives the details of the experimental work on which the conclusions are based. By means of a series of experiments checked by careful controls the author procured direct infection in 19 out of 20 mice fed with eggs of *H. fraterna* obtained

from another mouse. The rate of development was found to vary somewhat, in that individual worms arising from eggs ingested at the same time did not reach maturity in the same period. When the worm attained a length of 6–7 mm., ripe eggs were found in the older segments and were passed in the faeces on the fifteenth day. If the infection is mild the length of the adult may be 20–25 mm. but when it is very heavy, as when 100 or more individuals are found in a single mouse, the length of the majority does not exceed 10 mm. It would appear that an adult worm may get rid of most or all of its eggs in a week or so, and then degenerate and be itself passed out in the faeces, so that a mouse lightly infected may rid itself of the parasite.

The author was unable to confirm JOYEUX's statement as to the greater susceptibility to infection of very young mice, but found, on the contrary, that, as a general rule, the medium-sized animals (weighing 20–25 gm.) were best, the smallest and largest (except in one instance in which a mouse weighing over 35 gm. became infected with a weak concentration of eggs, showing the least liability to infestation.

H. H. S.

WOODLAND (W. N. F.). *Hymenolepis nana* **and** *H. fraterna.* [Correspondence.]—*Lancet.* 1924. May 3. pp. 922–923.

Thirty mice, free from *Hymenolepis fraterna*, were fed with fresh eggs of *Hymenolepis nana* from human cases and 27 mice of the batch were kept as control. 23 per cent. of the mice showed infection from the stools used, whereas the 27 controls remained free. These experiments are held to substantiate the view of SAEKI and UCHIMURA that *H. nana* and *H. fraterna* are one and the same species.

R. T. L.

BUTKA (H. E.). **Infestation with** *Hymenolepis diminuta* (**Rat Tapeworm**).—*Jl. Amer. Med. Assoc.* 1924. Mar. 15. Vol. 82. No. 11. p. 875. [1 ref.]

Small, whitish flakes in the stools suggestive of tapeworms were seen for five days before the patient, a boy 16 months of age, was brought to the hospital in Los Angeles because of hunger, loss of weight, restlessness and irritability. Eggs were numerous in the faeces and as a result of a vermifuge the worm was passed and measured 32 cm. in length with approximately 260 segments.

R. T. L.

INADAMA (Shingo). **A Case of** *Hymenolepis diminuta.*—*Japan Med. World.* 1923. Nov. 15. Vol. 3. No. 11. p. 240. With 2 text figs. Also *Jikkenigaku Zasshi* (*Jl. Experim. Med.*). 1923. Apr. Vol. 7. No. 4. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. pp. 47–48.]

A case of *Hymenolepis diminuta* occurred in a girl aged 4. She was born in a village at the foot of Mount Fuji (where 77 per cent. of the inhabitants are said to be bearers of various parasites' eggs). She was nursed on her mother's milk. Occasionally she had abdominal pain of unknown cause, and her stools were irregular, sometimes diarrhoeic. There was no clinical symptom other than a little anaemia. After a sudden attack of acute diarrhoea on the 24th September, 1922, a tape-worm was discharged. Since that period no more eggs have been demonstrated in her faeces. The worm is "25 cc." in length, with a maximum width of 3 mm.

R. T. L.

GREENWAY (Daniel). **Un caso autóctono de teniasis por** *himenolepis diminuta.* [A Case of Infection by *Hymenolepis diminuta.*]—Reprinted from *Prensa Méd. Argentina.* 1923. Dec. 30. 11 pp. With 5 figs.

Another instance of human infection by *Hymenolepis diminuta.* The patient was a child, 18 months of age, who seven months previously had an attack of fever for which the mother gave a purgative, and thereafter noticed pieces of a small tapeworm in the faeces. These continued to pass until the child was brought to the author for treatment and the nature of the infection was diagnosed.

H. H. S.

ASADA (Junichi). [*On Hymenolepis diminuta* **Rudolphi, which find the Host in a Dog.**]—*Okayama Igakkwai Zasshi* (*Jl. Okayama Med. Soc.*). 1923. Dec. No. 407. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 40.]

The author records the finding of this worm in a dog. It is frequent in the rat and is less common than is generally believed in man.

H. H. S.

MILLS (Ralph G.). **Notes on the Occurrence of** *Taenia saginata* **in North China.**—*China Med. Jl.* 1923. Nov. Vol. 37. No. 11. pp. 932–939. [7 refs.]

It is an erroneous assumption that beef obtained in Peking is not infected with tapeworm and is therefore safe for consumption without special inspection. The author has secured from a German butcher in Peking numerous samples of beef containing *Cysticercus bovis.* Moreover, *Taenia saginata* has been detected in 12 cases during two years, out of about 4,500 hospital patients. Two were foreigners and 10 were orientals ; all contracted the infection in Peking. While Chinese methods of preparing beef are effective in most instances, suspicion points to restaurants where there is haste and carelessness in food preparation.

R. T. L.

LEONARD (T. M. R.). **A Case of Acute Hiccough due to Cestode Infection.**—*Nigeria Ann. Med. & San. Rep. for the Year* 1922. pp. 26–27.

A man of 25 years was admitted to hospital in a collapsed state, owing to vomiting and incessant hiccough for the preceding six days. No physical signs of disease were found, except an eosinophilia in the blood and the presence of ova of Ascaris, Trichuris, Ancylostoma and *Taenia saginata* in the faeces. A dose of *Filix mas* caused vomiting and "an adult tape-worm, complete, twenty-six inches in length" was found in the vomit. Recovery rapidly ensued. A second case is briefly reported in which an adult *T. saginata* was vomited after four days' continuing hiccough.

H. H. S.

YOSHIDA (Sadawo) & TAKANO (Ryozo). [**On** *Diplogonoporus grandis* **(R. Blanchard, 1894) Luhe 1899. (Continued).**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1923. Dec. No. 2350. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 36.]

This case is said to be the fifth recorded of human infection by *Diplogonoporus grandis.* Since the previous four patients were all living by the

sea and since species of tapeworms related to this are found in sea-fish and marine animals, the authors suggest that man becomes infected by eating such animals in a raw or imperfectly cooked state.

H. H. S.

SCHNEIDER (Hans). **Eine Modifikation der üblichen Bandwurmkur mittels der Duodenalsonde.** [Administration of Taenifuges by the Duodenal Sound.]—*Wien. Klin. Woch.* 1924. Apr. 3. Vol. 37. No. 14. pp. 338–339. [12 refs.]

In order to overcome the nausea often produced by oral administration of anthelminthic drugs, with, at times, rejection of the drug by vomiting, or to obviate the difficulty exhibited by some patients in swallowing the large capsules, the author recommends the use of a duodenal sound for introduction of the medicament. He states that smaller doses will produce effect, that the tapeworms are in the majority of instances expelled entire, and that toxic symptoms are less commonly met with.

H. H. S.

PATTERSON (S. W.) & WILLIAMS (F. Eleanor). **A Stable Preparation of Hydatids for the Complement-Fixation Test.**—*Jl. Path. & Bact.* 1924. Jan. Vol. 27. No. 1. pp. 1–4. [4 refs.]

Hitherto in order to obtain a satisfactory antigen for the complement-fixation test in hydatid infection it has been necessary to procure fresh and uncontaminated fluid each time. This may not be a great difficulty where the disease is rife, as in Australia, but in England, where the test is only occasionally called for, it constitutes at times an almost insuperable obstacle. Filtration through porcelain of a contaminated fluid reduces the antigenic properties nearly to nil, even if kept on ice ; addition of antiseptics changes the value to such an extent that anomalous results are given, and dried fluid when re-dissolved is found to be no longer antigenic.

The authors found that alcoholic extract of scolices proved a more reliable antigen than even fresh fluid, not only qualitatively but quantitatively. Thus, of 30 proved cases of hydatid submitted to parallel tests 25 gave a positive with fresh fluid—9 of them +++, 4 a ++, and 12 a + ; with alcoholic extract all 30 were positive—20 of them +++, 4 a ++, 6 a +.

The question being one of importance the authors' description of the method of preparation may be quoted verbatim :—

"As much hydatid sand (scolices) as possible is aspirated aseptically from liver and lung hydatid cysts of infested sheep, sedimented from the fluid by slow centrifugation, and washed four times with sterile 0·85 per cent. salt solution, centrifuging down between each washing. The washed scolices are mixed with an equal quantity of kieselguhr, ground to a paste in a mortar, and added to about ten times the quantity of absolute alcohol. The mixture is incubated at 37°C. for three days, being shaken several times a day ; and is then kept in the ice-chest for a week. The supernatant fluid is then poured off, and used as the stock antigen, which is kept in the ice-chest till required.

"For use, 1 cc. of the alcoholic extract is put in a watch-glass and allowed to evaporate on the bench at room-temperature. The residue is rubbed up with 1 cc. of distilled water, and titrated with complement. As it has never been found anti-complementary, we have used it diluted one-third with 0·85 per cent. salt solution. The residue after evaporation seems to emulsify better with distilled water instead of saline solution."

Moreover, fresh hydatid fluid, although isotonic, is found to have a certain haemolytic effect, especially when the test is carried out at 30° C. for an hour. With prolonged ice-box fixation (18 hours at 4° C.) there is no such action and the results are stronger and more definite.

H. H. S.

THIELLÉ (Th.). **Quelques recherches sur la réaction de Weinberg pratiquées à l'Institut Pasteur de Tunis.**—*Arch. Inst. Pasteur de Tunis.* 1923. Dec. Vol. 12. Nos. 3–4. pp. 313–327.

WEINBERG's test for echinococcus infection, of proved value in Paris, had yielded consistently negative results in the hands of workers in Tunis. The author, therefore, undertook examinations of sera from human cases with sheep hydatid antigen obtained from WEINBERG's laboratory. Heating to 56° C. for an hour reduced the antigenic titre by two-thirds. Tests were carried by both the rapid and the slow methods with sera from 14 patients with hydatid cysts, and in a few instances the precipitin and cutaneous reactions were also tried. Antigens from man, ox, pig, as well as sheep, were used. It was found that better results were obtained if previous heating of the antigen was omitted. Fluid from man and pig proved stronger antigens than that of bovine origin, and, a most important point, it was found that echinococcus serum loses much of its antibodies when heated and may thus give a negative finding although a cyst is proved by operation to be present. The rapid method with unheated serum was, therefore, the better.

A second part of the paper gives a brief account of experiments for the purpose of obtaining an antiserum by injection of hydatid fluid into rabbits. Bovine fluid was employed and it was found that a more potent serum was yielded by rabbits injected at fairly short intervals, that such a serum was more active both for the precipitin and for Weinberg's reactions with bovine than with human fluid, and that, finally, a more active serum was produced by subcutaneous than by intravenous inoculation.

H. H. S.

CAMERON (Gordon). **The Staining Reactions of Hydatid Cysts.**—*Med. Jl. Australia.* 1923. Nov. 24. 10th Year. Vol. 2. No. 21. pp. 541–544. [5 refs.]

The author has investigated the micro-chemical aspect of hydatid disease, showing by means of staining reactions the various constituents of cyst walls and scolices. The subjoined table gives the staining reactions the deductions from which may be summarized as follows :—The endocyst and scolices tend to stain more by basic aniline dyes, the ectocyst by acid dyes. Fat appeared to be distributed throughout cyst wall and scolices, glycogen similarly but more in the endocyst. The Prussian-blue reaction for iron was much more evident in the endocyst and scolices than in the ectocyst. It is suggested that the leucocytic eosinophile reaction is the result of the substance in the ectocyst which reacts with eosin, or has some purposive connexion with it, thus possibly supporting KÄMMERER's view that in helminth infections neutrophile cells in the inflammatory zone take up toxic substances and convert them into eosinophile substance. The cyst

wall is shown to contain protein, fats, carbohydrates and inorganic salts, especially iron and calcium. Details of the staining methods are given and the paper is a valuable contribution to the subject.

| Stain. | Ectocyst. | Endocyst. | Scolices. |
|---|---|---|---|
| Haematoxylin and eosin | Diffuse pink (eosinophile) staining. | Patchy pink (eosinophile) staining, but with marked blue (haematoxylin) areas. | Patchy pink and blue staining, blue predominating. |
| Sudan III. | Extensive red granular staining. | Extensive red granular staining. | Diffuse deep red staining. |
| Van Gieson and haematoxylin. | Deep pink staining. | Deep pink, but with patchy blue staining. | Yellow or red or both combined. |
| Gentian violet. | Violet. | Light violet. | Diffuse deep violet or blue. |
| Gram's stain. | Diffuse pink (eosinophile). | Violet and pink patches. | Violet. |
| Langhan's stain. | Extensive brown granules. | Extensive brown granules. | Extensive brown granules. |
| Potassium ferro-cyanide. | Pale green staining | Blue patchy staining. | Deep blue staining. |
| Von Kossa's method (for calcium phosphate) | Minute black granules. | Minute black granules. | Minute black granules. |
| Giemsa's stain. | Light purple. | Blue. | Deep blue. |

H. H. S.

DÉVÉ (F.). **Enquête étiologique sur l'échinococcose en Tunisie.**—*Arch. Inst. Pasteur de Tunis.* 1923. Dec. Vol. 12. Nos. 3–4. pp. 353–386. [29 refs.]

This article is divided into 5 sections. In the first the author points out that a large proportion of the cattle of Tunis are infected with hydatid, in fact nearly all the old beasts brought for slaughter; also that 20–60 per cent. of sheep and 30 per cent. of the camels harbour the cysts. The goat is much less affected and the pig probably not at all. In the second section the question of the hosts of the Taenia is discussed and the three incriminated are the dog, the cat and the jackal; the former two from food thrown to them at slaughter-houses. Next, the mode of infection is dealt with and the chief source is shown to be contamination of the pastures by the faeces of dogs and jackals. The eggs in faeces will resist the drying of the sun for at least 11 days. A fourth section treats of the disease in man. Records of the frequency are very variable; thus, at the Sadiki Hospital there were 150 cases in 20 years, whereas Dr. PAGE, of Maktar, met with 26 and 31 in two successive years. The Arabs are much more infected than are Europeans, owing to the closer contact of the former with their dogs, and, for the same reason, females show a higher incidence than males. The majority of cases are met with between the ages of 20 and 40 years, but the author thinks that children are much more often infected than recent statistics show. Other sources than the dog are practically negligible as regards the human disease. Dirt-eating by children, the consumption of uncooked vegetables and fruits, and drinking of polluted waters, especially surface waters, are potent sources of Arab infection, but the main cause is the caressing of dogs, allowing them to lick hands and face, or to feed from plates and dishes, contamination from soiled paws, etc. Lastly, for prevention there are three chief

measures proposed: (1) reduction in the number of dogs, especially pariah and slaughter-house dogs (better still, keeping them from slaughter-houses altogether); (2) suppression of private slaughter-houses; (3) thorough inspection of meat and destruction of the viscera of slaughtered animals instead of throwing them to dogs.

H. H. S.

GREENWAY (Daniel). **Demografia de la hidatidosis humana en la Republica Argentina.** [Human Echinococcosis in the Argentine.] —15 pp. With 2 graphs. 1923. Buenos Aires: "Las Ciencias" Establ. Tipo-Litografico y Casa Editora de A. Guidi Buffarini, Calle Junin 845.

This paper deals almost entirely with statistics. A return of the number of cases of hydatid for the twelve years 1910–1921 inclusive is given [the detailed figures given in the table do not equal the total recorded on which the percentages are based]. Then follows a table showing the localization of the cysts; 64·5 per cent. were in the liver, the next highest being 14·6 per cent. in the lungs. More than half the patients were Argentinos, and some 60 per cent. came from Buenos Aires. The disease certainly appears to be on the increase; during the period in which the population has doubled the cases of hydatid have quadrupled, though part of this probably represents improvement in diagnosis. Reports from slaughter-houses show that hydatid disease has increased also among cattle and sheep during the same period of twelve years.

H. H. S.

FAIRLEY (K. Douglas). **Hydatid Disease of the Liver.**—*Med. Jl. Australia.* 1924. Feb. 23. Year 11. Vol. 1. No. 8. pp. 177–186. [16 refs.]

In this paper, based on an analysis of 167 patients suffering from hydatid disease of the liver, the author has dealt as comprehensively as possible in the space with an important subject. Multiple infestation was found to be common. The condition is latent in the early stages, fully half of the patients not seeking advice until the supervention of some complication called their attention to its presence. The most frequent of these complications was suppuration, though the usual indications—fever, rigors, sweating, leucocytosis—may be slight or absent owing to the thick adventitia preventing rapid absorption of toxic products. In the majority of uncomplicated cases pain is the first symptom, more rarely the presence of a tumour, or of jaundice. Pressure signs are mainly pulmonary, the chief being pleurisy and collapse of the lower lobe of the lung adjacent. Brief records are given of 6 cases to illustrate special features:—(1) An uncomplicated cyst of the right lobe in a woman of 45 years; (2) A suppurating cyst, complicated by ulcerative endocarditis and terminating fatally; (3) Suppuration with rupture into the peritoneal cavity in a man of 50 years; (4) Rupture of a non-suppurating cyst into the peritoneal cavity, the result of trauma; repeated operations have had to be performed on this patient for multiple cysts of the peritoneum; (5) & (6) To illustrate difficulties of diagnosis from history and physical signs, the former resembling cholelithiasis, the latter carcinoma of the stomach. Many patients are operated upon

for suspected gall-stones or cholecystitis; the author, therefore, recommends that, if at such operation little is found to account for the symptoms, the possible presence of hydatid of the liver should be borne in mind and that organ thoroughly explored.

In diagnosis reliance is to be placed on clinical signs, the use of X-rays (especially for the localization of cysts), and on biological tests. Exploratory needling is strongly condemned on account of the likelihood of the multiple sowing of peritoneal cysts following leakage of the fluid. Treatment receives brief mention. Complete removal is best, but is rarely possible; the next operation of choice is formalinization and closure of the cyst, the chief contra-indications being quoted from BARNETT's article in BYAM & ARCHIBALD's "Practice of Medicine in the Tropics"; lastly, where closure is definitely contra-indicated, "marsupialization"* is recommended. [Unfortunately, this term is not defined; the Australian practitioner is, perhaps, familiar with it, but for others the natural interpretation might be "disposal of the tumour to a kangaroo."].

H. H. S.

TASHIRO (Kikuo). [**Ueber den feineren Bau von** *Sparganum proliferum.* The Finer Structure of *Sparganum proliferum.*]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 492–493. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 65.]

The author concludes from his microchemical researches that the so-called "reserve nutritic matter" is nothing more than an excretory product. He has also discovered a hitherto undescribed cell group, which he calls "formative cells." These are thought to play an important part in the budding (*Knospung*) so characteristic of *Sparganum proliferum.*

R. T. L.

TASHIO (Kikuwo). [**Clinical, Pathoanatomical and Experimental Studies on** *Plerocercoides Prolifer* **Iijima or** *Sparganum* **Stiles.**]—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1923. Feb., Mar. & May. Nos. 2317, 2318, 2319, 2321, 2323, 2328 & 2330. [Summarized in *Japan Med. World.* 1923. Nov. 15. Vol. 3. No. 11. p. 248.]

Larvae of *Plerocercoides prolifer* have been found in almost every tissue of the body except the bone marrow. In the body of the worm are found innumerable glycogen granules. There are both typical and atypical calcium granules. In the gut of the monkey, cat, dog, white rat, chick, snake, etc., the young larva is digested. It is, however, transplantable into the hypodermic tissue or abdominal cavity of the monkey, dog and guinea-pig and develops and proliferates there.

R. T. L.

FÜLLEBORN (Friedrich). **Biologische Erwägungen ueber die "Wanderung" der Larven parasitischer Nematoden im Körper des Wirtes.** [Biological Considerations on the Migration of Parasitic Nematode Larvae in the Body of the Host.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Jan. Vol. 27. (1923.) No. 12. pp. 444–452. [21 refs.]

Travelling or migration (Wanderung) in so far as it conveys an idea of active locomotion is often wrongly used from the helminthological

* Defined by DORLAND thus:—The operation of stitching the edges of an ovarian tumour to the edges of the abdominal wound so as to leave a pouch. The sac suppurates, fills with granulations and shrinks.—ED.

aspect. There is true migration in boring from the intestine through the wall, as, *e.g.*, when Ascaris larvae escape from the ova, or when Ankylostome and Strongyloides larvae penetrate the skin, but much of the so-called migration is mere mechanical transference as by the blood- or lymph-stream, by movements of the cilia of the respiratory epithelium, or by the act of swallowing. Thigmotropism (boring movements on meeting with obstruction), thermotropism (attraction to a warm spot), entrance into a "transport host," are regarded as not necessarily purposive for developmental ends, but as a kind of "trial and error" by which the proper host is finally reached. The term "transport host" is not the same as "intermediate host"; it implies a host in which the parasite can remain alive for, perhaps, a long period, but merely as a chance habitation, not as necessary for development. With regard to Histotropism, in some cases, as, for example, ascaris, ankylostome and strongyloides larvae, passage through the lungs appears to be essential for further development, whereas in the case of Belascaris larvae growth proceeds in the lungs of the foetal dog (that is, where there is absence of free oxygen), but as soon as breathing is established, they retire elsewhere. In the case of Trichotrachelidae, on the other hand, sojourn in the lungs is not necessary for development; it is true that Trichinella larvae pass through the lungs to reach the general musculature by the systemic circulation, but they do not stay there. For those larvae which are to develop in the intestine this would be a mere "by-path" or "side-track," though the fact may account for infection of an unusual host by the parasite in question, for example the presence of Belascaris in mice who have fed on the carcases of dogs.

That histotropism is a definite process is supported by the fact that different worms seem to choose, as it were, definite tissues or organs in which to develop. Thus, the embryos of *Dirofilaria immitis* develop in the Malpighian tubes of the mosquito, whereas those of *F. bancrofti* do so in the thoracic musculature.

The author acknowledges that there are many gaps to be filled, but has published this paper as a "working hypothesis" to stimulate further research.

H. H. S.

HETHERINGTON (Duncan Charteris). **Comparative Studies on Certain Features of Nematodes and their Significance.**—*Illinois Biol. Monog.* 1923. Apr. Vol. 8. No. 2. pp. 111–166. With 4 plates & 6 text figs. [154 refs.]

This thesis deals with some new methods of nematode technique, but chiefly with a detailed consideration of the structure of the "primitive" nematode and with a discussion on the presence and significance of ciliation among nematodes. The use of Carnoy-phenol fluid is recommended. This is composed of absolute alcohol 20 cc., chloroform 15 cc., glacial acetic acid 5 cc., phenol crystals to raise the volume by 10 cc.; totalling 50 cc. The addition of a very small quantity of water is necessary for very delicate worms. After killing, the worms are cleared in the fluid and may be stored in 80 per cent. or 95 per cent. alcohol. For sectioning, oils of synthetic wintergreen and oleum cedri ligni (Merck) or chloroform may be dropped in slowly and mixed by shaking. When the mixture is three-quarters clearing fluid the greater part is drawn off and the pure liquid added. For paraffin infiltration, wax is shaved into a dish and the whole set aside in a slightly

warm place for 2 hours when the worm may be placed in pure paraffin, of 58°C., melting point, and after proper infiltration, embedded and sectioned.

R. T. L.

SENEVET (G.) & DECHAUX. **L'helminthiase intestinale infantile en Algérie. 1re enquête (Vauban, avril 1923).**—*Arch. Inst. Pasteur d' Algérie.* 1923. Dec. Vol. 1. No. 4. pp. 645–646. [1 ref.]

When examining the blood of children in the Vauban region the authors found that some of them showed a very high degree of eosinophilia, up to 55 per cent. They therefore examined the stools of 23 children between 4 and 12 years of age, 10 boys and 13 girls. Six of the former and 11 of the latter were harbouring worms. The commonest was *Ascaris lumbricoides*, present in 14, *Trichuris trichiura* next, in 6.

H. H. S.

KOSUGE (Isami). **Histologische Untersuchungen ueber das Eindringen von *Strongyloides stercoralis* in die Haut von Versuchstieren.** [Penetration of the Skin of Experimental Animals by *S. stercoralis*.] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Jan. Vol. 28. No. 1. pp. 15–20. With 6 figs. [6 refs.]

The author carried out experiments to determine the mode of penetration of the skin by larvae of *Strongyloides stercoralis.* He shows, by sectioning the tissues, that the same route is not always followed. In the case of a thin skin, such as that of the abdomen of a mouse, penetration is direct, but in animals with thicker skin, such as the dog, entrance is effected by the hair follicles, whence they penetrate the outer root-sheath. They then make their way into the subcutaneous tissues by perforating the sheath at the side or at the termination centrally. No larvae were found in the blood-capillaries but they were present in the lymph-vessels. He thinks that in man entrance may also occur by way of the sweat ducts.

H. H. S.

GAMINARA (Angel) & RINALDI (Mario). [**Note sur l'existence en Uruguay de cas autochtones d'anguillulose** (*Strongyloides stercoralis*, **Bavay 1876**).]—*Bol. del Consejo Nacional de Higiene.* 1923. June. Vol. 18. No. 200. p. 575. [Summarized in *Bull. Office Internat. d' Hyg. Publique.* 1923. Dec. Vol. 15. No. 12. p. 1627.]

This note shows that there are indigenous cases of infection by *Strongyloides stercoralis* in Uruguay, but so far found only in the Department of Colonia. The parasite was present in 4·3 per cent. of persons examined. All those affected were accustomed to walk about bare-foot. The general condition of the patients rapidly improved after administration of male-fern.

H. H. S.

MORISHITA (K. O. R.). **A Pig Nematode, *Gnathostoma hispidum*, Fedchenko, as a Human Parasite.**—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 23–26. [8 refs.]

MORISHITA (Kauru). **On a New Species of Gnathostoma, Causative Agent of Creeping Disease.**]—*Hifuka Hitsunyokika Zasshi* (*Jl. Dermat. & Urol.*). 1923. Oct. Vol. 23. No. 8. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 42.]

The occurrence of *Gnathostoma hispidum*, a common parasite of the pig, is here recorded for the first time as a parasite of man.

A young female specimen was found in a piece of cutaneous tissue excised in the surgical clinic of the Tokyo Imperial University. The patient from whom the parasite had been removed was a Japanese aged 43 who had lived long in Tokyo. He had felt a slight pain on the left thenar eminence and subsequently a linear swelling developed, growing from 1 cm. to about 8 cm. within three days. The case was diagnosed as having the typical clinical features of *Dermatitis linearis migrans.* A small black object was visible through the skin. This, on excision, proved to be a *Gnathostoma.*

The author adds that he has to put on record two additional cases in man of *G. spinigerum,* both from China, which will be described at a later date.

R. T. L.

ANDERSON (John) & others. **Filariasis in British Guiana (A Report of the Filariasis Commission, 1921).**—Memoir 7, Vol. 5, of the *London School of Tropical Medicine Research Memoir Series.* 1924. (Helminthological Researches in the Caribbean Area, under the Direction of R. T. LEIPER). 122 pp. With 23 plates. [2 refs.] London: Helminthological Department, London School of Tropical Medicine, 23, Endsleigh Gardens.

This Memoir constitutes the Report of the Filariasis Commission sent out to British Guiana by the London School of Tropical Medicine in 1921. It consists of seven chapters and an addendum. The first chapter deals with the geography and physiography of the Colony, together with remarks upon the population, the water supply, conservancy and vital statistics. The second treats of the clinical aspects of filariasis in British Guiana. Evidence is brought forward to show that many apparently healthy inhabitants harbour the parasite and have done so for years without exhibiting any signs to call their attention to the fact. Some accident or infection, trivial in itself, such as a scratch, a strain, a chill, may, however, serve to start the train of symptoms indicative of filariasis, notably lymphangitis, lymphadenitis and elephantiasis, less commonly chyluria, orchitis, lymphatic varix and lymph-scrotum. Many have glandular enlargements, femoral, inguinal, or both, but the first sign of attack is usually acute pain in the course of the lymphatic vessel, not at, but some distance below, the gland mass. Septic foci may develop in this lymphatic tract, giving rise to filarial abscess, or, if extending to the abdominal lymphatics, to "abdominal filariasis," in reality an acute septicaemic condition, practically always fatal. In only one of 48 patients with filarial abscess were adult filariae found, but in 41 streptococci were present, in 22 with staphylococci also, and in 5 cases the latter were alone. Reference is made to the work of Dr. MANSON-BAHR in Fiji in 1912 who found an adult filaria in only one of 23 abscesses examined.

The previous work of WISE (1910) calling attention to the important rôle played by pyogenic organisms in filarial abscess is also mentioned, in the chapter on Vaccine therapy (p. 84).

Enlarged glands were common amongst children. Of 196 examined at the Christchurch School, Georgetown, over 60 per cent. showed them, but in only 11·7 per cent. were filarial embryos found, and it was clear that causes other than filariasis were accountable for the adenitis. But allowing for this, there is doubtless a large percentage of the

population suffering from glandular enlargements associated with filarial infection; the parasite, however, seemed to be harmless so long as no severe bacterial invasion occurred. Five types of elephantiasis are described, but they would appear to be grades rather than types, passing from the oedematous limb with thickening of the skin to those with irregular contour and greater hypertrophy of skin and so to the true elephantoid condition. In more than 92 per cent. of 434 patients the lower limbs only were involved, whereas chyluria was found in only 1·9 per cent. of 709 patients who visited the clinic under the auspices of the Commission.

Chapter III dealing with the pathology of the disease is a short one, but the morbid histology is well shown by the reproductions of the camera lucida drawings appended to the report. Autopsies were performed in 28 cases. Fourteen of these died of "acute septicaemia" arising from some inflammatory focus in the lymphatic system. Filarial parasites were also present, but that these played more than a preparatory rôle could not be proved. In no instance were they found to have caused complete occlusion of the lymph-channel, so that the old idea that the symptoms arose largely from occlusion, stasis and back-pressure due to a dead or aborting female filaria is shown to be erroneous, or, at all events, found no support from the investigations of the members of this Commission. On the other hand, filariasis could not be ruled out as a cause of elephantiasis. The evidence obtained made it almost certain that practically every case of elephantiasis had at one time harboured filarial parasites, that an inflammatory condition ensued, and that to this the symptoms were eventually due, whether the parasite itself survived or died. The distribution of the embryos in the different organs was not found to agree with that noted by MANSON. MANSON found that they were nearly three times as numerous in the lungs as in any other organ, but according to the present report the number in the kidney was nearly three times as great as in the lung of a patient dying during the day, and eight times as numerous in a patient dying during the night.

Chapters IV and V, giving a description of various methods of treatment adopted, are most instructive in spite of the fact that the conclusions to be drawn are largely negative in character. The former is concerned with the results of the employment of different colloidal metal preparations, mainly the standardized "Oscol" products of Messrs. Oppenheimer, Sons & Co. Oscol Argentum, Arsenium, Cuprum, Hydrargyrum, Manganesium, and Stibium, and also preparations supplied by the Wellcome Research Laboratories were tried in different cases. Tables are given showing the details as regards dosage, mode of administration, and the results of blood-examination for embryos before, during, and after treatment. The results obtained were very conflicting; the best (where none proved satisfactory) seemed to be some antimony derivative, although the effect as regards the number of embryos in the blood was practically nil. Eusol (40 cc.) and corrosive sublimate solution (3–4 cc. of a 1 per 1,000 solution) injected intravenously appeared to be of service in acute septicaemic states. A considerable number of patients, 52 in all, were treated by injections of vaccines, mostly detoxicated polyvalent streptococcal vaccines, and this line of treatment yielded on the whole better results than those obtained by the use of drugs.

Chapter VI is statistical; it has already appeared separately and is reviewed in this Bulletin (see below). The final chapter contains

a summary of the findings and the general conclusions of the members of the Commission. These are of sufficient importance to warrant quotation almost in full :—

1. Practically one-fifth of the inhabitants of the colony harbour *Filaria bancrofti*, and the infection is largely urban in its distribution.
2. The intermediary host is the domestic mosquito, *Culex quinquefasciatus*.
3. There is no evidence of racial immunity to filarial infection.
4. Infestation by *Filaria bancrofti, per se*, produces no symptoms; all the pathological manifestations associated with filariasis are due to secondary infection by pyogenic organisms.
6. The clinical manifestations in filariasis, arising from secondary infection, can be treated with considerable effect by various antiseptic measures and by the injection of specific vaccines.
7. The only hope for total eradication of the disease from the Colony lies in prophylaxis, . . . the complete banishment of the particular mosquito from the dwellings of the people.
8. The prophylactic measures applicable to British Guiana are :—
   (*a*) The obligatory use of mosquito curtains.
   (*b*) The provision of a pipe-borne water supply . . . to replace the present system of barrels and vats. By this measure, the principal breeding-places of the domestic mosquito would be destroyed.
   (*c*) The installation of a modern system of sewage disposal.
   (*d*) A comprehensive scheme for draining the coast lands.
   (*e*) The vigorous application of ordinary anti-mosquito measures . . . and the education of all classes to the advantages of individual effort in the same direction.

An addendum to the Memoir has been contributed by Dr. G. M Vevers; in this is given a list of the various species of mosquitoes collected in British Guiana. It shows that the present Commission has confirmed the work of Dr. G. C. Low on *Aëdes argenteus* and filarial development (1901). Some investigations were made by Dr. Vevers to discover the intermediate host of *F. ozzardi*, but these were inconclusive.

H. H. S.

Anderson (J.), Khalil (M.), Lee (C. U.) & Leiper (R. T.). **A Filarial Survey in British Guiana, 1921.**—*Jl. Helminthology.* 1923. Dec. Vol. 1. No. 5. pp. 215–226. [6 refs.]

This paper constitutes a most valuable record of the prevalence of filariasis in British Guiana. The expedition was fortunate in having among its members one who was able to get into personal touch with East Indian immigrants, and another with the Chinese, so that facilities were present which enabled a wide range of subjects to be examined, and the results may be regarded, therefore, as authoritatively representative of the extent of infection in 1921. The subjoined Table shows that there has been a considerable increase of infection since 1896, though it must be acknowledged that none of the previous investigations have been carried out so thoroughly and extensively as this last, and that the increase has probably not been so great as would be inferred from the Table.

The figures of infection among prisoners are interesting as showing that filariasis is largely urban, for the percentage among those formerly resident in Georgetown is just three times as great as that among those from the country districts. In a compact area (Albert Town) in the

heart of Georgetown blood specimens of 204 males were examined and 36·3 per cent. contained filarial embryos, while of 311 females 26·7 per cent. were positive. There was a marked preponderance of infection among the black races and among the males as compared with the females, except in the town of New Amsterdam, and here the number examined was too small to be of much statistical value as regards sex prevalence.

Finally, the question of age incidence was the subject of enquiry. Of 196 children attending the Christchurch School there was very little difference in the degree of infection amongst those between 4 and 10 years of age and those between 11 and 16 years. 515 persons were examined in Albert Town, and the highest incidence was found amongst those in the second and fourth decades, but above 20 years the percentage was fairly uniform.

GEORGETOWN AND DISTRICT.

| | | A. 1896 | B. 1908 | C. 1919–20 | D. 1921 |
|---|---|---|---|---|---|
| Number examined .. .. | | — | — | 351 | 2,434 |
| | | % | % | % | % |
| Blacks .. .. | Male | 13·0 | 10·2 | 24·8 | 30·8 |
| | Female | 24·0 | 16·8 | 26·0 | 30·0 |
| Mixed .. .. | Male | 14·2 | 18·3 | 27·3 | 26·9 |
| | Female | 24·0 | 16·8 | 21·4 | 21·3 |
| East Indians .. | Male | 6·4 | 5·4 | 14·2 | 12·4 |
| | Female | 6·6 | 6·2 | — | 9·3 |
| Portuguese .. | Male | 16·6 | 16·4 | 15·4 | 23·8 |
| | Female | 25·0 | 24·8 | 16·7 | 21·3 |
| Chinese .. .. | Male | — | — | — | 10·0 |
| | Female | — | — | — | 4·5 |
| Europeans .. | Male | — | — | — | 9·4 |
| | Female | — | — | — | 7·7 |
| All above .. .. | Male | 10·8 | 9·7 | 19·5 | 22·4 |
| | Female | 20·1 | 17·3 | 23·3 | 19·3 |

A.=percentage found amongst the patients of Georgetown Hospital by CONYERS and DANIELS.
B.=corresponding infection found by WISE.
C.=percentage found by ROSE during a general survey of normal members of the population.
D.=percentage found by authors of the present paper.

H. H. S.

HAGA (J.). **Filariasis-onderzoek over dag.** [Filariasis Examination in Daytime.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 6. pp. 864–884. [9 refs.].

Prof. KUENEN remarked that filariae could be detected in daytime when applying a concentration method after haemolysis by means of saponine. The difficulty of obtaining saponine and the drawback that after 5–10 minutes coagulation occurs in the tubes led the author

(with BARTO) to modify it. Saponine is obtained from the fruits of *Sapindus rarak*, the soap fruit which is well known to the natives of the East Indian Archipelago and is very cheap. The outer skin of the fruit is rubbed in a mortar with a little 0·9 per cent. salt solution and sterile sand, filtered, the same salt solution is then added up to 900 cc. and mixed with 100 cc. 0·3 per cent. sodium citrate. 9 cc. of this liquid in a centrifugal tube are mixed with 10–20 drops of blood. Haemolysis is complete at once and coagulation does not occur. The filariae are easily found in the sediment after centrifuging. The scattered filariae present in the blood in daytime are thus detected and research is much simplified, especially as working in native villages may be practically impossible at night. Comparison with the ordinary thick drop clearly showed the superiority of the concentration method. For preservation of the solution addition of ½ per cent. carbolic acid did not interfere with its haemolytic action; sterilization by heat proved to be less satisfactory.

W. J. Bais.

SWEET (W. C.). **The Periodicity of Microfilaria Bancrofti in Brisbane.**—*Health.* Melbourne. 1924. Mar. Vol. 2. No. 2. pp. 42–46. [1 ref.]

Evidence is given to show that an examination of the blood after 9 p.m. gives reliable information concerning the presence of microfilaria. If taken between the hours of 8 p.m. and 6 a.m. the blood slides will give an accurate result for diagnosis. If taken between 7 p.m. and 7 a.m. the slides will be accurate in a considerable percentage of cases. The blood from the finger is better for the purpose than that from the ear. One patient who had been on night duty showed a re-arranged periodicity which reverted to normal on his return to day duty. The author states that *Culex quinquefasciatus* is the common carrier in Brisbane and that *Stegomyia aegypti* is not a susceptible intermediary. She is of opinion that no connexion obtains between periodicity and the biting habits of mosquitoes. Dr. CILENTO adds a note to the article suggesting that the "starter" which calls out the microfilariae before sleep is the presence of fatigue, and he demurs to the suggestion that the reversibility of periodicity may be held to demonstrate that there is no relationship between mosquito habits and filarial periodicity.

R. T. L.

ROSE (F. G.). **A Rare Lesion found in Connection with Infection with** *Filaria bancrofti.*—*British Guiana Med. Annual for 1923.* p. 67.

An unusual lesion due to *Filaria bancrofti* consists of small tumours of the skin, the tissue covering them being so transparent as to give the appearance of a bullous eruption. When incised, however, they are found to be semi-solid and to contain a quantity of blood-stained serum, rather than blood, in which are to be found at any time of the day varying numbers of filarial embryos. They are, apparently, permanent, in one case at least having been present for a period of over 2 years. To the touch they are hard and do not pit on pressure. In the two cases which have come under observation these swellings were multiple, some being larger than others. In both cases they appeared on the flexor aspect of the forearm. Both cases also gave histories of continual itchings and of periodic attacks, in which the swellings become larger and reddened along with intense pain and the appearance of a red line running along the forearm.

R. T. L.

ROSE (F. G.). **The Leucocytes of the Blood in Infection with *Filaria bancrofti*, with a Note on the Use of Vaccines in Filarial Condition.**—*British Guiana Med. Annual for 1923.* pp. 73–90.

A simple infection with *Filaria bancrofti* has apparently no effect on the Arneth index. When clinical symptoms occur the index almost invariably shifts to the left. This shift also occurs in filarial oedema and elephantiasis when not of long standing and bears a relation to the duration and severity of the attacks. It is well known that septic infections cause a shift to the left, and the author's investigations confirm the view that pathological symptoms in filarial infection are invariably due to pyogenic organisms.

A series of tables are given to show that the first result of the onset of an attack of filariasis is a relative increase in the polymorphonuclear cells. Favourable progress is accompanied by a relative increase in the lymphocytes. A relative increase in the neutrophiles occurs in abscess-formation and in all cases at or before the climax of the attack.

R. T. L.

DIAMANTIS. **Un cas de chylurie filarienne traité et guéri par le tartre stibié.**—*Jl. d' Urol.* Paris. 1923. Dec. Vol. 16. No. 6. pp. 471–474.

The author records the case of a man, 38 years of age, suffering from chyluria of recent onset. The urine was chylous from 10 a.m. to bedtime, clear and without albumin, pus or blood during the interval. Sodium-antimony-tartrate was injected intravenously, starting with 0·03 gm., increasing gradually to 0·13 gm., a total of 0·83 gm. being given in eight injections over a period of 17 days. After the fifth injection the urine was only slightly opalescent and became quite clear after the sixth. Ten months later there had been no return of symptoms and the patient was in good health.

H. H. S.

ASCANIO RODRIGUEZ (J. B.). **Un caso de Filariasis.**—*Rev. Med. y. Cirug.* Caracas. 1923. Oct. 31. Year 6. Month 12. No. 67. pp. 241–245. (Discussion pp. 245–247.)

A case of filariasis with a somewhat unusual history is recorded. The patient was of mixed American and Japanese parentage, was brought up in Demerara, and had lived for a short time in Trinidad before coming to Venezuela. He suffered from a left inguinal bubo, believed to be venereal in origin, which was incised. Shortly after the wound healed the patient experienced sudden pain in the right groin and flank, with shock and collapse, and "passed purulent urine containing small calculi." Filaria embryos were found in the blood.

The case formed the pretext for discussion on the question of indigenous filariasis in Venezuela.

H. H. S.

SUGANUMA (Seijiro) [**On Chemotherapy of Filariasis.**]—*Chugwai Iji Shimpo* (*Internat. Jl. Med.*). 1923. May & June. Nos. 1035 & 1038. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 275.]

Picric acid preparation was proved to have the most remarkable curative efficiency in chyluria. Although a remarkable numerical decrease of the microfilariae in the urine could be obtained by its use, total removal of the parasites could not be effected. The author considers that these observations on picric acid preparations throw light on the advance which may be made towards a successful chemotherapy for filariasis.

R. T. L.

HONDA (Ikuya). [**Ueber die pathologischen Veränderungen der Niere bei Filariasis.** The Pathological Changes in the Kidneys in Filariasis.]—*Kyoto Ig. Z.* 1921. Vol. 18. pp 28–44. [Summarized in *Japan Jl. Med. Sciences*. Tokyo. 1922. Vol. 1. No. 1. p. 65.]

The pathological changes of the kidneys in dogs affected with *Filaria immitis* are found to be very similar to those seen in man infected with *Filaria bancrofti*. According to the author, these changes are due to the microfilariae which had settled down in these organs. In experimental dogs there occurred interstitial nephritis, pseudotubercles and infarct of the kidneys. In a woman of 38, suffering from filariasis, there were seen infarcts, increase of interstitial tissues, atrophy of the glomeruli and distension of the blood and lymph vessels.

R. T. L.

BROUGHTON-ALCOCK (W.). **Case of Filaria without Clinical Symptoms: Embryos of** *F. perstans* **in the Blood.**—*Proc. Roy. Soc. Med.* (Sect. Trop. Dis. & Parasit.). 1924. May. Vol. 17. No. 7. p. 46.

The blood of a man who returned home at the end of 1923, after two terms of service, each of 18 months, in Northern Nigeria was examined as he was suspected to be suffering from malaria. There was an eosinophilia of 12–28 per cent. No malaria parasites were seen, but occasional embryos of *F. perstans*. Whether the eosinophilia was due to this or whether there was also a *Loa loa* infection was not determined.

H. H. S.

POUCEL (J.) & CARRIEU (M. F.). **Au sujet d'un cas de filariose nocturne** (*Filaria bancrofti*).—*Rev. Méd. et Hyg. Trop.* 1924. Feb. Vol. 16. No. 2. pp. 50–55. [22 refs.]

A soldier, aged 35 years, a native of Martinique, was sent to hospital with a diagnosis of left inguinal hernia. Except for the swelling and its site none of the usual signs of hernia were present. There was, in addition, a hydrocele on the right side. His blood contained 11 per cent. eosinophiles, so smears were made at various times between 10 p.m. and 1 a.m., and embryos of *F. bancrofti* were found. They were numerous also in the hydrocele fluid.

H. H. S.

LOW (George C.). **Unusual Varieties of Calabar Swellings, with a Note upon the Aetiology of the Condition.**—*Lancet.* 1924. Mar. 22. pp. 594–595. With 1 fig. [1 ref.]

Calabar swellings are usually localized; a rare diffuse form occurs and an example is described and illustrated in this paper, the swelling implicating the whole of the right hand and forearm. The author gives strong presumptive evidence in favour of his view that the Calabar swelling arises from the liberation of toxin following upon the death of the worm in the subcutaneous tissues and quotes a case where the worm could be felt for some time as a small inert mass in the penis following upon a transient swelling.

R. T. L.

FAIRLEY (N. Hamilton) & LISTON (W. Glen). **Studies in the Pathology of Dracontiasis. Part I.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 915–932. With 2 figs. & 4 plates. [4 refs.]

In the production of the lesions of dracontiasis the adult female, the embryos and secondary bacterial invaders are all concerned. Some

toxic substance is produced by the female worm which is injected by her into the tissues beneath the dermis. The local effect is to produce a blister and the absorption of the toxin accounts for the early clinical manifestations such as urticaria, cyanosis, dyspnoea, vomiting, giddiness, fainting, diarrhoea and the like.

The guineaworm embryos produce subacute sterile abscesses, but acute abscess, cellulitis, bubo and synovitis are all due to bacterial invaders. Serological investigations yielded entirely negative results, and it was found that guineaworm extracts were deficient in the particular chemical complex on which antigenic function depends. The associated tissue reactions, both macroscopical and microscopical, are described in detail. The existence of a fibrous tissue sheath surrounding the worm in the subcutaneous tissues has clinical importance.

R. T. L.

MARTINAUD (G.). **Quelques observations sur les différentes méthodes de traitement des vers de Guinée.**—*Bull. Soc. Path. Exot.* 1924. Feb. 13. Vol. 17. No. 2. pp. 146–149.

Novarsénobenzol intravenously gave very good results in two cases of guineaworm. Four cases were treated with tartar emetic which effects a very rapid and satisfactory cure. [These results confirm MACFIE; see this *Bulletin*, Vol. 18, p. 124.]

R. T. L.

ASADA (Junichi). [**Ueber die Infektion und die Wanderung von** *Ascaris lumbricoides* **in Körper.** Infection with *A. lumbricoides* and its Migrations in the Body.]—*Tokyo Ij. Shsh.* 1921. pp. 161–168; 219–223. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 3. p. 229.]

From extensive experiments, chiefly on mice but also on rabbits and guineapigs, the author obtained the following results:—1.—With ascaris eggs kept over 10 weeks at a temperature of 26°–32° C. only a few embryonate naturally. 2.—The ascaris eggs embryonate in culture media, *e.g.*, garden soil, and the larvae are able to penetrate the skin. 3.—Hatching takes place 1–12 hours after feeding, in the small intestine of the experimental animal. 4.—The larvae pass from the small intestine into the posterior part of the gut and within 12 hours pass through the gut wall in great numbers into the body cavity. 5.—The larvae then pierce the liver and are carried by the blood to the lungs, where they undergo further development. Thence they wander through the bronchi, trachea and larynx to the oesophagus, stomach and small intestine, where they complete their development. A small number pass through the diaphraghm direct into the lungs. 6.—A small number of larvae appear to reach the liver *via* the portal system.

R. T. L.

ASADA (Junichi). [**Experimentelle Untersuchung ueber die Entwicklung und Infektionswege von** *Ascaris lumbricoides.*]—*Ni. Byor. Gak. K.* Tokyo. 1921. Vol. 11. pp. 476–477. *Tokyo Ij. Shsh.* 1921. pp. 161–168; 218–223. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 61.]

Contrary to YOSHIDA's view that the larvae which have passed from the digestive tract into the cavity reach the pleural cavity by

penetrating the diaphragm and then enter the lung tissues as in the case of *Paragonimus westermanii*, the author has been able to show by exhaustive researches on mice, rats and guineapigs that the larvae, freed in the lumen of the gut, pass into the peritoneal cavity through the gut wall, this penetration generally occurring between the middle of the small intestine and the upper part of the large intestine, mainly, however, in the lower part of the small intestine and in the caecum. They then penetrate into the liver through its surface, and from here are carried to the lungs by the blood stream. The writer does not deny that a few of the larvae may follow the course stated by YOSHIDA. As an alternative route it was found that a certain number of larvae reach the liver, after having been freed in the intestinal tract, direct with the blood stream of the gut wall.

In addition, the author deals with the developmental stages and the period which the larvae appear in individual organs subsequent to feeding.

R. T. L.

ASADA (Junichi). [**Studies on the Abnormal Infection Route of Ascaris. I. Communication. On Per Os Infection of the Larve.**]—*Tokyo Ijishinshi* (*Tokyo Med. News.*) 1923. June. Nos. 2335 & 2336. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 276.]

Ascaris larvae which had been growing in the liver and lungs of a chick had the capacity of developing further when swallowed by another animal.

R. T. L.

ASADA (Junichi) [**Resistance of the Ascaris Larvae in the Egg Shell.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1923. July. No. 2339. [Summarized in *Japan. Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 277.]

Even when left for nine days in the freezing state or for one month drying at room temperature 15°C. and for seven days in 5 per cent.–10 per cent. saline solution the Ascaris larvae survive, but they die after heating for 10 minutes or more at 50°C.

R. T. L.

ASADA (Junichi) & KOHGAME (Yoshiki). [**Experimental Studies on the Resistance of the Ascarid Larvae against Physico-Chemical Stimulations.**]—*Okayama Igakkwai Zasshi* (*Jl. Okayama Med. Soc.*). 1923. Dec. No. 407. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. p. 40.]

As a result of experimental work the author found that Ascarid larvae have a high resisting power against acids, in particular hydrochloric acid. The same holds good as regards Japanese wine, but not with sugar.

H. H. S.

TAKANO (Ryozo). [**On the Statistical Studies of Ascariasis among the City Children.**]—*Iji Shimpo* (*Med. News*). 1923. Apr. No. 1115. [Summarized in *Japan Med. World.* 1923. Nov. 15. Vol. 3. No. 11. p. 246.]

In city children of Osaka a far lower morbidity from ascariasis occurs than in country children; moreover, the incidence was higher in the older children in the city as contrasted with that in country children.

R. T. L.

TAKANO (Ryozo). [**Contribution to the Knowledge of Development of Ascaris.**]—*Osaka Igakkwai Zasshi* (*Jl. of Osaka Med. Soc.*). 1923. July. Vol. 22. No. 7. [Summarized in *Japan Med. World.* 1924. Jan. 15. Vol. 4. No. 1. p. 15.]

The average number of days taken to hatch ascaris eggs in H-ions was 14, in Ca-ions 16, in Na-ions 22·1, Mg-ions 23·3 and in Soda water 27·4 days.

R. T. L.

TAKANO (Ryoji). [**On the Albuminous Membrane of Ascaris Eggs. II. Communication.**]—*Osaka Igakkwai Zasshi* (*Jl. of Osaka Med. Soc.*). [Summarized in *Japan. Med. World.* 1923. Nov. 15. Vol. 3. No. 11. p. 250.]

The albuminous membrane of Ascaris eggs swells up in a dilution of HCl at 0·1 per cent.–4 per cent., but not in higher concentrations than 6 per cent. Lactic acid also produces a similar result. Formalin interrupts this, but not calcium chlorate or sodium chlorate nor alcoholic beverages, sugar, soy and vinegar.

R. T. L.

KOINO (Sui). [**Infection Experiments of Ascariasis in Human Body. II. Communication. On the Young Larvae expectorated in Ascarid Pneumonia.**]—*Saikingaku Zasshi* (*Jl. of Bact.*). 1923. July. No. 334. [Summarized in *Japan Med. World.* 1924. Feb. 15. Vol. 4. No. 2. pp. 46–47.]

Human beings were fed with Ascaris ova. Eight days later the larvae made their appearance, and during the succeeding eight days continued to be expectorated. The average length of these larvae was 1·746 mm. and their breadth 0·099 mm. They disappeared at the end of 16 days after the feeding with ova. The numbers found in the sputum appeared to bear a definite relation to the severity of the condition set up.

H. H. S.

KOKI (Shizukazu). [**Durch die Einwenderung von jungen Askarislarven hervorgerufene pathologische Veränderung des Gewebes. II. Mitellung.** Pathological Changes of the Tissues produced by the Invasion of Young Ascaris Larvae.]—*Tokyo Ij. Shsh.* 1921. pp. 2298–2302. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. pp. 63–64.]

The blood changes in artificial infections with young ascarid larvae were studied in rabbits. The writer was able to show an eosinophilia increasing parallel with the degree of infection.

R. T. L.

OKUJIMA (AIJIRO). [**Ein Fall von durch Einwanderung von Ascaris hervorgerufenem Empyema pleurae.** A Case of Empyema produced by Migration of Ascaris.]—*Fukuoka Ikw. Daig. Z.* 1921. Vol. 14. pp. 1–6. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 64.]

The author in an operation for left thoracic empyema found a dead male Ascaris in the pleural cavity. As pus and bile passed into the pleural cavity after the operation and from chemical examination of the colouring matter adhering to the parasite, the author concludes that the ascaris passed from the original abscess in the peritoneal cavity (perhaps the liver) through the diaphragm into the pleural cavity.

R. T. L.

MATSUBARA (Kinichi). [**On the Changes in the Lungs in Experimental Ascariasis in the Homogeneous Animal (A Preliminary Report).**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1923. Feb. No. 2315. [Summarized in *Japan Med. World.* 1923. Oct. 15. Vol. 3. Nos. 9 & 10. p. 224.]

The following points are specific for ascariasis pneumonia, which can be distinguished from ordinary bronchial pneumonia :—" presence of the larvae of ascaris in the sputum ; mostly prone to have haemorrhage ; no edematous changes discernible around the foci ; the exudates occurring in the alveoli and the bronchus do not show any sign of necrosis ; . . . . ascariasis pneumonia rather shows the features belonging to desquamative pneumonia."

R. T. L.

YOSHIDA (Sadawo). [**On Some Studies on Ascaris.**]—*Osaka Igakkwai Zasshi* (*Jl. Osaka Med. Soc.*). [Summarized in *Japan Med. World.* 1923. Nov. 15. Vol. 3. No. 11. p. 250.]

The eggs of Ascaris die immediately in 50 per cent. solutions of hydrochloric acid, sulphuric acid, glacial acetic acid, nitric acid and formalin. They live and develop in 5 per cent. solution of common salt, but die within several weeks in 25 per cent. or 20 per cent. Caustic solution kills them in several days, although they may live even for 2–3 weeks in 40 per cent.–45 per cent. solutions and for longer in lower concentrations. Boiling water kills them instantly. In formalin 15 per cent.–25 per cent. the embryonated eggs may live for a week and for the same period in 0·5 per cent.–1 per cent. carbonic acid solution. In lysol they die in 5 days in 1 per cent., 7 days in 5 per cent. and 3 days in 10 per cent. Sudan III is the best means of determining by staining technique if the eggs are alive or dead.

R. T. L.

MOTTA (L. Cunha). **Ascariasis of Intrahepatic Bile Ducts with Calculus Formation, Dilatation of Ducts, and Chronic Cholangeitis.**—*Jl. Amer. Med. Assoc.* 1924. Jan. 12. Vol. 82. No. 2. pp. 85–87. With 4 figs. [12 refs.]

This is a record of another case of Ascaris in a bile duct in the liver. There was marked dilatation of the duct, with surrounding fibrosis, and the parasite was an adult. In other ducts there were friable calculi of varied size, brownish-yellow in colour, which the author thinks probably resulted from worms which had died and become disintegrated. A brief summary of the literature relative to previously recorded cases is given.

H. H. S.

ENGEL (Rudolf). **Beitrag zur Askaridenerkrankung der grossen Drüsenorgane in der Bauchhöhle.** [Ascarid Infestation of the Large Abdominal Viscera.]—*Muench. Med. Woch.* 1924. Mar. 28. Vol. 71. No. 13. pp. 403–404.

A man, 46 years of age, shortly after a meal was seized with acute abdominal pain which became localized to the epigastrium. Ten days later he was sent to hospital. He was obviously very ill, with the signs of acute peritonitis. The stomach was washed out and two ascarides, each 30 cm. in length, were evacuated, a third being vomited a few hours later. The general condition becoming worse laparotomy was performed. There were signs of peritonitis and fat-necrosis of the transverse mesocolon. Behind the gall-bladder was an abscess which was opened accidentally by the exploring finger, and the tail of the pancreas was hard and swollen.

The patient bore the operation badly and died 14 hours afterwards. At the autopsy an ascaris, 15 cm. in length, was found in a bile duct in the centre of the liver, another in the ductus choledochus, and two very large ones free in the duodenum. Between the liver and pancreas was a large abscess which had made its exit towards the head of the latter, setting up the fatal peritonitis. The changes in the liver due to the presence of the ascaris were very slight and there were no signs of pus in that organ.

H. H. S.

WATKINS (Thomas H.) & MOSS (Olin W.). **Report of Two Cases of Intestinal Obstruction caused by Roundworms following Dosage of Santonin.** —*Jl. Amer. Med. Assoc.* 1924. May 3. Vol. 82. No. 18. pp. 1442–1443.

A peculiar coincidence is here related in which two children belonging to the same family exhibited within a fortnight closely similar symptoms. Their ages were 3 and 4½ years respectively, and they were suspected of harbouring Ascaris. Without any preliminary treatment, dietetic or otherwise, santonin was given, 3 gr. to the younger, 4 gr. to the elder, followed by a purgative of calomel. Each passed one worm, but vomiting and pain continued and a mass was felt in the abdomen. Operation showed this to be due to Ascarides; 49 were removed from the first, 53 from the second.

H. H. S.

ROBERTSON (M. O.). **Surgical Conditions caused by Intestinal Parasites: Report of Two Cases.**—*Jl. Amer. Med. Assoc.* 1924. Mar. 1. Vol. 82. No. 9. p. 717. [3 refs.]

The first of these cases was a man of 20 years with symptoms of perforating appendicitis. At the operation three small perforations were found in the lower ileum and three specimens of *Ascaris lumbricoides* were extracted through the perforations. The second was a Japanese child, 2 years and 3 months old, operated upon for a perforated appendix. This was removed and the following morning an Ascaris was found under the dressing. Both patients made an uneventful recovery.

H. H. S.

COOK (Archibald S.). & TASKER (D. G. C.). **Discharge of** *Ascaris lumbricoides* **through Appendicitis Scar.** [Memoranda].—*Brit. Med. Jl.* 1924. Apr. 12. pp. 664–665. [1 ref.]

A girl, aged 12 years, was operated upon for peritonitis resulting from perforating appendicitis. Four weeks later the child left hospital with the wound nearly healed. A serous discharge continued, however, associated with itching in the wound, and three months later three adult and two small *Ascaris lumbricoides* made their way through the lower part of the scar where the tube had been. Two days later a dead adult female ascaris was passed, per rectum, santonin having been given when the first worm appeared. The wound then healed. The parasites had not caused the perforation, for the peritoneum was very carefully mopped free of exudate at the operation and they would have been seen. They had probably been living in the small intestine without causing any symptoms and later passed down and made their way out through the appendical stump.

H. H. S.

GALLIE (W. E.) & BROWN (Alan). **Acute Hemorrhagic Pancreatitis resulting from Roundworms. Report of Case.**—*Amer. Jl. Dis. of Children.* 1924. Feb. Vol. 27. No. 2. pp. 192–194. [2 refs.]

Acute haemorrhagic pancreatitis is a rare condition in children. A case is here described in which the cause was probably the entrance of an Ascaris into the ampulla of Vater. A child, 2½ years of age, was suddenly seized with acute abdominal pain and vomiting. These symptoms continued for 9 hours, and then as suddenly ceased. The only physical sign detected was a swelling about 3½ inches long by 1 inch broad running transversely across the abdomen just below the level of the pylorus. Except for the fact of the narrowness of the swelling and its fixity it resembled an intussusception. At operation, forty hours after the onset of symptoms, the tumour was found to be the pancreas covered by acutely inflamed omentum. The mass was studded with small patches of fat-necrosis. Fifteen hours afterwards a full-sized Ascaris was extracted through the mouth. Recovery was uneventful. Though the worm was not seen at the operation and subsequent treatment failed to demonstrate any others, the authors believe that the pancreatitis was due to the worm obstructing the ampulla and that the sudden cessation of the pain and vomiting indicated the withdrawal of the parasite.

H. H. S.

KORTZEBORN (A.). **Ein Spulwurm in der freien Bauchhöhle als Todesursache nach einer Magenresektion.** [Death after Resection of Stomach caused by an Ascaris in the Peritoneal Cavity.]—*Muench. Med. Woch.* 1924. Apr. 11. Vol. 71. No. 15. pp. 473–474. [11 refs.]

COLMERS has recorded a case in which, ten days after operation for gastric carcinoma, a fistula developed by which, four days later, an Ascaris emerged, which otherwise would probably have perforated into the abdominal cavity and set up a fatal peritonitis. The author gives details of a somewhat similar case. The patient, a woman 56 years of age, was operated upon for "hour-glass" stomach associated with gastric ulcer; death occurred six days later from peritonitis. At the autopsy the site of the operation appeared healthy and the peritonitis was ascribed to the presence of a living ascaris in the abdominal cavity. The author states that the abdomen was carefully explored at the operation and concludes that the worm probably made its way from the stomach shortly after the operation, and before the wound in the viscus became sealed. He mentions that in the Pathological Institute at Strassburg, there is a preparation showing this migration actually taking place, and points the moral that before abdominal operations faecal examinations should be carried out, and, if time allows, the patient be first treated for the helminthic infection.

H. H. S.

THORNTON (H.). **The Relationship between the Ascarids of Man, Pig and Chimpanzee.**—*Ann. Trop. Med. & Parasit.* 1924. Apr. 30. Vol. 18. No. 1. pp. 99–100. With 2 figs. [1 ref.]

A comparison of *Ascaris lumbricoides* from Man, Pig and Chimpanzee by the author leads him to confirm the findings of previous workers that morphologically these forms cannot be distinguished.

R. T. L.

WUNDT (Nora). **Ueber Möglichkeit der intraintestinalen Entwicklung von Oxyuren unter Umgehung der Magenpassage.** [The Possibility of Intra-Intestinal Development of Oxyuris without Traversing the Stomach.]—*Muench. Med. Woch.* 1924. Apr. 25. Vol. 71. No. 17. pp. 546–548. [23 refs.]

This is an interesting paper describing experimental work carried out to test the possibility, or rather the likelihood, of Oxyuris developing

directly in the body. The material was obtained from the interior of excised vermiform appendices. Fifty such were examined and in twelve of them Oxyuris was found. GOEBEL's findings (1921) are quoted and in the main were confirmed, but the author concludes that the small intestine is not a favourable site for development of the ova. The appendix is shown to be a hiding place for the parasite and not the place of growth. Attempts at artificial development in the incubator of eggs obtained from the appendix proved unsuccessful. Eggs proved very resistant to drying and were alive after being kept for weeks in the air, though they were killed in 24 hours or so at 37°C. She was unable to develop those with granular contents under any experimental conditions, but if those with embryos were placed in gastric juice of average acidity and normal saline the embryos escaped, whereas they were killed when placed in fluid from the duodenum, small intestine, or appendix. It is highly improbable, therefore, that Oxyuris can develop within the intestine without the eggs passing out and entering again by the mouth. [In this point the author differs from GOEBEL, who reported that he had succeeded in obtaining development of ova deposited in the intestine to mature worms in the lowest part of the small intestine and in the appendix.]

H. H. S.

SANDGROUND (J. H.). "*Oxyuris Incognita*" **or** *Heterodera radicicola?* —*Jl. Parasit.* 1923. Dec. Vol. 10. No. 2. pp. 92–94. With 4 text figs. [4 refs.]

Curious ova, having a general outline suggestive of the bean-shaped eggs of the genus Oxyuris, have been noted in the human stool by KOFOID and WHITE, and others (see this *Bulletin*, Vol. 17, p. 87). The author has now identified them as ova of *Heterodera radicicola*, a common root-parasitic nematode of radishes, celery, carrots, turnips and potatoes. By feeding experiments he has shown that eggs indistinguishable from the "*Oxyuris incognita*" ova appear in human stools after the ingestion of parasitized roots.

R. T. L.

LANE (Clayton). **The Mass Diagnosis of Ankylostome Infestation. (Parts II to VII.)**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. Dec. 13 & 1924. Jan. 17. Vol. 17. Nos. 6 & 7. pp. 407–436. With 4 figs. [19 refs.]

The present paper is a continuation of that which appeared in the *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. xvi. No. 6 (this *Bulletin*, Vol. 20, p. 947). A large number of points are dealt with, many of them in great detail, and only the most important can be mentioned in a review such as this. The first section (Part II) describes the technique of the author's simplified Direct Centrifugal Floatation (D.C.F.) method of concentrating hookworm ova. For obtaining a uniform quantity of faeces a special cylindrical tube is used and pressed into the faeces till it is filled. Water is added to within an inch of the top of the centrifuge tube and the faecal mass disintegrated. A second important point is the rate and time of centrifuging of this emulsion, namely, 1,000 revolutions per minute for one minute. Thirdly, the deposit is to be evenly suspended in saturated salt solution, specific gravity 1,200. The primary emulsion should not be made of this because of bubble formation and the rising of lumps if the

stool be fatty. The remainder of the procedure is as previously described. In Part III it is shown that for accurate counting the film must not be either too deep or too dense. If not sufficiently shallow the ova will not be in one optical layer and enumeration will in consequence be difficult; if too dense some ova will escape recognition. The remainder of this section is occupied by a consideration of previous methods of control devised by the author and by STOLL, all of which are shown to be faulty. A new method, denominated Control E, as checked by Direct Centrifugal Floatation, has proved more accurate, diminishing the adhesiveness which is an important element in lessening the value of the previous control methods.

Part IV treats of the question of examination of preserved stools, since the counts must be inaccurate if either hatching of larvae or death of ova and consequent disintegration take place before the specimen reaches the laboratory. The effect of temperature is marked: thus, a specimen in water kept on ice and at 22°C. for 7 days showed ova all of normal appearance, whereas at 41°C. all were degenerate. This matter is again referred to in Part VI where it is shown that the best results (*i.e.*, the least change) are obtained by the use of thymolized water on ice. The specimen of faeces is disintegrated in the original tube which is nearly filled with water to which one drop of a 10 per cent. solution of thymol in spirit is added. In Part V. a consideration of the relation between the ovum content of the stool and the hookworm content of the bowel is taken up. BAERMANN'S "cultivation method" is shown to be very erroneous; STOLL'S estimate of 44 ova per cc. of solid stool per female is stated to be nearer the mark, though the ratio is still undetermined. Part VI. is a disquisition on the accuracy and consequent reliability of the author's method. With fresh stools the first centrifuging gives an average of 76 per cent. of the total ova, the second 18, the third 2, the fourth 1, and the pour-off 3 per cent. With preserved stools those kept in thymolized water and on ice yielded 72 per cent. at the first centrifugation, those kept in plain water 70 per cent. The D.C.F. method, it is claimed, will detect with certainty in 1 cc. of stool in suspension, kept for a week at a temperature below 30°C., the ova from a single normally ovipositing ankylostome. Lastly, it is demonstrated that reducing the area of examination by "discing" (that is, allowing the hanging-drop on the coverslip supported by the small masses of plasticine to touch the slide, or by running from a pipette the concentrated salt solution between the two till a disc of 10 mm. diameter was produced) did not proportionately reduce the time required for microscopic examination, and that the advantages did not seem to outweigh the disadvantages.

H. H. S.

FÜLLEBORN (Fr.). **Ueber "Taxis" (Tropismus) bei Strongyloides-und Ankylostomenlarven. (Vorläufige Mitteilung.)** [Tropisms of Strongyloides & Ancylostome Larvae.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Apr. Vol. 28. No. 4. pp. 144–165. With 5 figs. [12 refs.]

By the term "Tropism" or "Taxis" the author intends "the movements of an animal in a definite direction due to the action of a directing stimulus" (richtungsgebender Reiz). His experiments were carried out mainly on larvae of *Strongyloides stercoralis* and *Ancylostoma caninum*, and occasionally on those of free-living nematodes. Several

forms of this taxis are dealt with in detail, some of which have received briefer mention in previous papers. *Thigmotaxis*, or thigmotropism, may, perhaps, be defined as the stimulus of contact. This is not the same as the power of penetration exhibited, *e.g.*, in skin-penetration. The collection of the larvae at the circumference of a drop of water is interpreted as thigmotaxis set up by the resistance of the surface tension.

*Positive Oxygen- and Negative Carbon dioxide taxis.*—By the use of an ingenious apparatus it is shown that the oxygen of the air exercises a power of attraction on Strongyloides larvae in water, while the admission of $CO_2$ produces a repelling action, or at least leads to their withdrawal. Chemotaxis of other kinds are just mentioned, but this the author has not yet determined. *Tonotaxis* may possibly play a part in the penetration of tissues by larvae, as, for example, the passage of ascaris through the intestinal wall.

*Hydrotaxis.*—Since Ancylostoma and Strongyloides are not very resistent to drying it is probable that there is some such stimulus to seek moisture, but nothing is known at present in this regard. From experiments devised to prove or disprove hydrotropism, though this could not be definitely excluded, on the other hand the positive was not proved. The same applies to Barytaxis (or Geotropism), Phototaxis and Electrotaxis.

*Thermotaxis*, as already described by KHALIL, was noted by Professor Fülleborn in the case of Ancylostome, Necator, Strongyloides, and other larvae, but not with free-living larvae. KHALIL found that larvae at the periphery of a drop of water were not attracted by the source of heat. This, the author explains, is due to thigmotropism from the surface layer of the fluid, and he shows experimentally that the latter can be overcome by the former.

*Rheotaxis*—the direction taken by bodies when placed in a current of fluid flowing through a narrow tube—is a negative one with filariform strongyloides larvae and with ancylostome larvae and also, apparently, with the corresponding stages of free-living nematodes; that is, their anterior extremities point away from the direction of flow and they, as it were, swim against the current.

The whole paper is of great interest, and details are given of the experiments devised to test the points referred to, but it is, unfortunately, impossible to describe these in a brief review, and all concerned in helminthological work would reap advantage by studying the original.

H. H. S.

DE LANGEN (C. D.). **Prenatal Infection by Ankylostoma.**—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1923. Part 3. pp. 275–277.

The author found three ankylostome ova in examining two smears of the faeces of an infant 6 days old. Two other medical men in Batavia found ova, one in a new-born child's second motion, and the other on the seventh day after birth. The only possible explanation except prenatal infection is that, owing to unclean habits on the part of the mother, ova may have been introduced into the mouth and have passed through the alimentary canal unchanged.

H. H. S.

McBrayer (R.). **The Basal Metabolic Rate in Uncinariasis.**—*Southern Med. Jl.* 1923. Dec. Vol. 16. No. 12. pp. 922–923.

The basal metabolic rates were determined in six cases of hookworm infection; four had also incipient tuberculosis. Five of the six had an abnormal rate and four, whose cases were followed, slowly reached normal after thorough treatment for the hookworms. Several weeks passed before the normal was attained. All had a moderate degree of anaemia—red cells 3,460,000 to 4,960,000 and haemoglobin 65 to 85 per cent.—but there was no apparent relationship between the anaemia and the metabolic rates.

H. H. S.

Cilento (R. W.). **Some Problems in Hookworm Disease at the State Orphanage, Townsville.**—*Med. Jl. Australia.* 1923. Oct. 20. 10th Year. Vol. 2. No. 16. pp. 403–408. With 1 sketch map. [7 refs.]

This paper is a report on the conditions responsible for hookworm disease at the State Orphanage, Townsville, Queensland. In the locality of Townsville the incidence of hookworm is less than 2 per cent., whereas in 72 inmates of the orphanage 50 per cent. were positive. *Trichuris* occurred in 22·2 per cent. and *Hymenolepis nana* in 5·6 per cent. Of 47 children who had been "fostered out" 53·3 per cent. were infected with hookworm, showing that they tend to retain the infection they acquire in the orphanage. It was ascertained that there was a heavy soil infestation in certain areas frequented by the children both at work and play. The measures, based upon our present knowledge of the disease, necessary to meet the particular conditions obtaining in the orphanage are related in detail.

R. T. L.

de Nooy (J. A.). **Investigations as to the Presence of Ankylostoma Larvae in the Soil of the Native Villages at Batavia.**—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1922. Pt. 3. pp. 125–134. [3 refs.]

For the purposes of this investigation the author took from each site to be tested ten tins each with a capacity of 600 cc. The soil was placed in sieves and these in wide funnels filled with water and fitted with a rubber tube and clip at the exit. The larvae were found to pass into the water which was then drawn off and examined. By addition of 7 per cent. caustic potash solution sheathless and free-living larvae were killed, the sheathed not being affected. Those kampongs (native villages) with a stream flowing through had a soil practically negative, because the stream was used as a public latrine. In "dry kampongs," *i.e.*, those having no such stream, the soil in the neighbourhood of 20–25 per cent. of the latrines was infected.

Being struck by the enormous number of fly-larvae in the latrines the author took the opportunity of investigating whether flies might not play a part in the dissemination of ancylostomiasis. By an ingenious experiment he found that in 20 hours ten flies had carried—on their bodies and limbs, not passed through their intestines—400 larvae from a culture of *A. caninum*. Analogous results, though the numbers carried were less, were obtained with *A. duodenale*. Again, flies were seen to deposit eggs on a culture of hookworm larvae. The maggots

hatched out and wandered on to the table and were found also to be carrying larvae. Both adult and larval flies can, therefore, aid in the dissemination of ancylostomes.

The author contradicts Looss's statement that "mature ankylostome larvae cannot withstand desiccation even for the space of a second; indeed they always die before they become completely dry." A flake of culture of larvae was taken up in a platinum loop and exposed to the glaring sun for an hour and a half. The shrivelled larvae recovered their normal movements after transference to water. Further, larvae of A. *caninum* were placed on a slide and dried for 24 hours in an incubator at 37°C., but revived again in water. Half of the larvae from a human case revived after drying for 20 hours at 37°C. The question as to whether revived larvae are capable of causing infection was not determined.

Lastly, a suspension of larvae of *A. caninum* was accidentally spilled on the laboratory table; irritation and redness of the skin of one of the workers indicated penetration, but ova did not subsequently appear in the faeces. This, therefore, constitutes a negative contribution to the solution of the question as to the infectibility of man by *A. caninum.*

H. H. S.

MHASKAR (K. S.). **Hookworm Infection in the Soil.**—*Indian Jl. Med. Res.* 1924. Jan. Vol. 11. No. 3. pp. 951–960. [8 refs.]

The Trichinopoly Municipality has a trenching ground extending over 260 acres of waste land for the disposal of night soil. It is divided into three blocks, each of which receives human excrement for one year. The trenches are 18 ins. deep, 30 ins. wide and are 12 feet apart. The night soil is spread out to a depth of 9 ins. and is covered with 9 ins. to 12 ins. of fairly broken earth. They are fully exposed to sun and rain. Very little vegetation is allowed to grow. After three years the trenches are dug up and sold as agricultural manure. From this area the author collected 288 samples so as to correspond to practically every day of the year. The results of his investigation are tabulated, and the conclusions drawn are:—The longest period that hookworm larvae live in night soil is 14 weeks. They diminish rapidly from day to day, especially after the 8th week. The larvae are found only in soil that has been directly contaminated with faecal matter. The "unsheathing" of hookworm larvae is a normal occurrence. Nightsoil can be safely used as manure after a period of 6 months. Deep trenching offers no advantages in the elimination of the infections and has the disadvantage of keeping the night soil in a fluid state. In Trichinopoly hookworm incidence is low although there is daily indiscriminate soil infection, for infection is localized to places where faecal matter is actually deposited.

R. T. L.

TSUTSUI (Koichiro). **Experiments on the Resisting Power of the Hookworm Egg and Larva against Heat.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1924. Mar. No. 233. p. 6.

55°C. was the highest temperature to which hookworm ova could be submitted for a positive culture of larvae to be obtained afterwards. The results of culture of ova which had been raised to 57°C. was always negative.

Encysted hookworm larvae were placed in tubes standing in hot water at temperatures ranging from 45°C. to 65°C. The larvae were always found dead after submission to 55°C. These tests shew that hookworm eggs and larvae contained in faeces can be destroyed if the temperature is raised to 57°C. or more.

R. T. L.

THIROUX (A.). **Sur un procédé destiné à empêcher l'infestation du sol par les larves d'ankylostomes dans les pays chauds.**—*Bull. Soc. Path. Exot.* 1924. Apr. 9. Vol. 17. No. 4. pp. 303–306. [5 refs.]

As the temperature of fermenting horse-manure will destroy fly larvae it is suggested that hookworm larvae may be killed in a similar manner. M. ROUBAUD, who spoke on the question, pointed out that the practical application was less simple than the theory.

H. H. S.

FÜLLEBORN (Friedrich). **Bemerkungen ueber die Identifikation von "Hakenwürmern."**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Jan. Vol. 28. No. 1. pp. 12–15. With 6 text figs. [2 refs.]

RILEY and FITCH recorded that *Uncinaria polaris* and *U. stenocephala* were identical and that *U. criniformis* had not been found in dogs or cats. Professor Fülleborn found a hookworm in an East African dog and infected other dogs with the material from this and obtained from the intestine of one of them a nematode, the males of which measured 5–7·5 mm. He makes use of these to illustrate the first of the statements above and to controvert the second. According to the position of the parasite the appearances under the microscope are shown to be those represented by LOOSS in one place as *U. criniformis* and in another as *U. polaris*. He agrees that the last-named is not a valid species, but does not discuss the question of nomenclature as to whether this specimen should be named *U. criniformis* or *U. stenocephala*. He writes this paper to show how different the appearance of a worm may be according to its position on the slide. A plate of 6 figures well reproduced illustrates the points advanced.

H. H. S.

TONINA (T. A.). [**Hookworm in Argentina.**]—*Semana Medica.* Buenos Aires. 1923. Aug. 2. Vol. 2. p. 191. [Summarized in *Jl. Amer. Med. Assoc.* 1923. Dec. 22. Vol. 81. No. 25. p. 2154.]

Hookworm is stated to be common in a large part of Argentina, but in children infection may lie latent and only gives rise to symptoms as early adult life is reached. At the Buenos Aires Children's Hospital only 36 cases have been under treatment in 15 years.

An extract of hookworms is employed for testing, analogous to the Schick reaction in diphtheria.

H. H. S.

ROSS (G. A. Park). **Hookworm Infection and Disease (Ankylostomiasis) in Natal and Zululand.**—*Med. Jl. S. Africa.* 1924. Mar. Vol. 19. No. 8. pp. 238–241.

This brief paper is an extract from a report by the author to the Native Affairs Department, Natal, in 1910, and is of historical interest only. As

a result of investigations carried out in that year it was concluded that ankylostomiasis was rare and unimportant among the Zulu population and was practically confined to the coast flat. It is said to be non-existent in Natal at the present day.

H. H. S.

FISCHOEDER (Edward). **Badania serologiczne nad choroba tegoryjcowa. Serologische Untersuchungen bei Anchylostomiasis.**—*Medycyna Doswiadczalna i Spoleczna.* Warsaw. 1923. Vol. 1. No. 5–6–7. pp. 338–344. German Summary p. 243. [6 refs.]

With the idea that the anaemia associated with hookworm infection was the result of repeated anaphylactic shocks due to absorption of albuminous toxins produced by the parasite, the author attempted to evolve a precipitin reaction between the serum of a patient and a saline extract of adult and embryo *Ancylostoma*. Though he was unable to obtain any such reaction with the patient's serum he succeeded in so immunizing a rabbit with embryos that a definite precipitating serum was produced in that animal.

H. H. S.

KAI (Toshiwo). [**On the Resistance of the Erythrocytes against Hypotonic Solution and Saponin Solution as well as Blood Findings in Ankylostomiasis.**]—*Fukuoka Ikadaigaku Zasshi* (*Jl. Fukuoka Med. College*). 1923. Mar. Vol. 16. No. 2. [Summarized in *Japan Med. World.* 1923. Nov. 15. Vol. 3. No. 11, p. 244.]

In ascariasis the erythrocytes have a wider [higher ?] range of resistance against hypotonic saline but a lower resistance against saponin. After complete vermicidal treatment the resistance became normal. These phenomena paralleled those found in anaemia. Latent haemorrhage was positive in the faeces before and negative after treatment. In 27 per cent. of the author's cases there were retinal haemorrhages, while in the 1st Department of the Internal Medicine of the Kyushu Imperial University retinal haemorrhages occurred in about 31 per cent.

R. T. L.

HOSONE (Sanzo). [**On Ankylolysin.**]—*Nihon Biseibutsugaku Zasshi* (*Jl. Japan Microbiol. Soc.*). 1923. Feb. Vol. 17. No. 2. [Summarized in *Japan Med. World.* 1923. Dec. 15. Vol. 3. No. 12. p. 272.]

The author has demonstrated a haemolysin named "Ankylolysin" in the body of ankylostomum which "has the power to liberate the host's blood corpuscles which had been sucked up into the stomach."

R. T. L.

GIGLIOLI (G.). **Ankylostome Inspection in Mackenzie, Rio Demerara. (Report on Carbon Tetrachloride in the Treatment of Hook Worm.)**—*British Guiana Med. Annual for 1923.* pp. 151–173.

At Mackenzie City—a bush settlement of the Buaxite Co., in British Guiana—the employees have been examined for hookworm. Ankylostomiasis is practically non-existent, for there is a careful examination for anaemia prior to engagement. The incidence of hookworm as an infection is, however, high—approximating 80 per cent. The author has had opportunity of testing the efficacy of various anthelminthics. He finds carbon tetrachloride "by far the most effective and practical

drug for the treatment of ankylostomiasis." It is not unpleasant to take, it in no way interferes with the patient's usual work, it is a stable chemical product, of easy posology, and is much cheaper than any other drug. A great deal could be done by a properly directed systematic and general mass treatment system in a country like British Guiana, and the author illustrates in an appended note the truth of his contention by giving details of his experience in treating 800 persons from Mackenzie City and Akyme on these general lines. Tabular statements show the condition of the faeces after the mass treatment.

R. T. L.

SAWYER (W. A.) & SWEET (W. C.). **A Comparison of Certain Methods of Treatment and Diagnosis of Hookworm Infection.**—*Arch. Intern. Med.* 1924. Jan. 15. Vol. 33. No. 1. pp. 35–46. With 2 figs. [5 refs.]

An examination of the inmates of the Hospital for the Insane at Sandy Gallop, on the outskirts of Ipswich, in Queensland, showed 27·1 per cent. to be infected with hookworm. The infection was light and in most cases had been contracted before transfer from the hospital at Goodna, upon which the authors have already reported (see this *Bulletin*, Vol. 21, p. 225). From comparative studies made on 119 infected persons the authors conclude that in doses regarded as sufficiently safe carbon tetrachloride is not as efficient (for use on a large scale in the field) as chenopodium in dealing with *A. duodenale.* Oil of chenopodium in a 1·5 cc. dose given in two equal parts at an interval of 2 hours followed by a purge was highly efficient and superior to the dose undivided. Willis' salt-flotation technique is a simple and efficient test for the presence of infection. Although carbon tetrachloride is a mild laxative, it cannot be depended upon in moderate doses or mixed with chenopodium to move the bowels. A purge three or four hours after administration is advisable. The selective action of carbon tetrachloride on the female worms is insignificant. The usual series of charts and statistics shewing relative efficacies and percentages of worms discharged illustrate the text.

R. T. L.

FIELD (F. E.). **Carbon Tetrachloride in the Treatment of Human Ankylostome Infection.**—*British Guiana Med. Annual for 1923.* pp. 174–181.

Using 4 cc. of carbon tetrachloride as the dose for adult males the author agrees with NICHOLLS and HAMPTON that this drug is the best vermifuge for ankylostome infection. In nearly all the cases there was giddiness, nausea and burning in the stomach and in a few rather severe vomiting after administration of the drug, but there were no symptoms 12 hours later. The vast majority of the worms were passed on the first day. The author assesses his percentage of cures at 80 per cent. after one treatment and the remainder after a second treatment.

Carbon tetrachloride is safe if given in small doses. It is quite unnecessary to give adults more than 3 cc. The drug was used in the case of a very anaemic and ill pregnant woman and she delivered a

premature child 4 days after treatment. The author regards it as doubtful whether the drug induced labour, but he recommends chenopodium with castor oil as safe in these cases.

R. T. L.

BAIS (W. J.). **Over de beteekenis van Tetrachloorkoolstof voor de bestrijding der mijnwormziekte in het groot, en over de giftigheid van dit middel.** [On the Significance of Carbon Tetrachloride for combating Hookworm Disease on a Large Scale and on the Toxicity of this Drug.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 1. pp. 151–178. With 2 graphs in text. [30 refs.]

After a hookworm campaign of 10 years' duration in an indentured Javanese labour force on tea estates of Sumatra, carried out in the first place by mass treatment with chenopodium oil, the author found hookworm disease to be still prevalent among the coolies (average wormcount in apparently healthy coolies, 138). He ascribes this (1) to the interference of filling of the stomach with the results of the chenopodium cure when administered on the estates, (2) to the fact that chenopodium oil is less effective in the lighter degrees of infection. The action of carbon tetrachloride is not at all or much less subject to these drawbacks. After the introduction of carbon tetrachloride as a routine cure (2–3 mass treatments in 1½ years) the wormcount in the labourers decreased to 13, whilst the general state of health (admission rate for hookworm disease, general sickness rate, average haemoglobin percentage) improved considerably as shown in a graph.

There occurred, however, 3 cases of fatal intoxication with the drug (3 cc.), which are quoted. The literature on the toxicity of carbon tetrachloride is reviewed and the author ultimately advocates a lower dosage for the routine treatment.

W. J. Bais.

CADBURY (Wm. W.). **Carbon Tetrachloride in the Treatment of Uncinariasis.**—*Amer. Jl. Trop. Med.* 1924. Jan. Vol. 4. No. 1. pp. 13–21. [11 refs.]

An investigation was carried out at the Canton Christian College with the twofold purpose of determining the prevalence of hookworm infection amongst the workmen and of comparing the efficacy of treatment by chenopodium oil with that by carbon tetrachloride.

Of 172 men examined 119, or 69 per cent., were positive. These were divided into small groups, some being treated with the former drug, others by the latter. The oil of chenopodium was given in three doses, each of 1 cc., in capsules, at hourly intervals in the early morning and was followed in three hours by an ounce of castor oil. The carbon tetrachloride was given in doses of 3–6 cc. in 20 cc. of water. At first a preliminary saline purge was administered, but this was not found necessary, and in a few instances only, where no evacuation occurred, was castor oil given subsequently. Thirty-one were treated once with oil of chenopodium, and of these 18 were cured, whereas of 36 treated with one dose of carbon tetrachloride 13 were cured. The statement of HAMPTON and others that a single dose of 3 cc. of the latter drug will completely cure 90 per cent. of cases was not borne out by the author's results.

H. H. S.

PEYRE (E. L.). **Le tétrachlorure de carbone dans le traitement de l'ankylostomiase.**—*Bull. Soc. Path. Exot.* 1924. Feb. 13. Vol. 17. No. 2. pp. 145–146.

Carbon tetrachloride has lately been used in place of oil of chenopodium for the treatment of ankylostomiasis in Cayenne and Saint-Laurent with excellent results. 113 patients were treated at Cayenne and 34 at Saint-Laurent. 3–4 cc. were given on two or three successive days, and on the third or fourth day 30 gm. of sulphate of magnesium or sodium ; no preparation such as alteration of diet was made. Three doses proved much better than two, the latter giving 41 per cent. of successes, the former 76·4 per cent. at Saint-Laurent, and 80·5 per cent. at Cayenne. The drug is preferred by the patients to either oil of chenopodium or thymol, and the cost is only about one-fortieth that of the former. In spite of the reputed risk of damage to the liver one case of cirrhosis with ascites was treated without any ill-effects.

H. H. S.

HALL (Maurice C.) & SHILLINGER (Jacob E.). **The Effect of Magnesium Sulphate, simultaneously administered, on the Efficacy and Safety of Carbon Tetrachlorid for the Removal of Hookworms.**—*Amer. Jl. Trop. Med.* 1924. Jan. Vol. 4. No. 1. pp. 1–12. [13 refs.]

Experiments on six dogs infested with hookworm shewed that the simultaneous administration of magnesium sulphate with carbon tetrachloride did not impair the efficacy of the anthelminthic, yet increased the safety factor on account of the decreased absorption of the drug. The combination deserves a trial in human cases.

R. T. L.

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CORRECTIONS.

In the review of Dr. G. C. SHATTUCK's paper on "Clonorchiasis in Boston," published in the *Bulletin*, Vol. 21, No. 3, p. 197, it is stated that the 54 cases cited occurred in Japanese. Of these two cases were briefly described. For "Japanese" one should read Asiatics. The two cases described by the author were Japanese, but the remaining 52 cases quoted as reported by Dr. NUTE from among immigrants were Chinese. [Dr. SHATTUCK has kindly directed attention to this error.]

R. T. L.

On page 212 in the review of SHATTUCK's "A Case of Filariasis apparently contracted in Boston," the reviewer's spelling of *Charleston*, referred to as the one active endemic focus in the south, has unfortunately been altered by the printer to *Charlestown*, thus creating confusion with Charlestown, Boston, Massachusetts, where the case recorded actually occurred.

A. G. B.

## REVIEWS AND NOTICES.

ARAUJO (H. C. de Souza). **A Lepra. Modernos estudos sobre o seu tratamento e prophylaxia. (Artigos de propaganda sanitaria e vulgarização scientifica, publicados na "Folha do Norte" de 1921 a 1923.)** [Leprosy. Studies on its Treatment and Prophylaxis.]—*Departamento Nacional de Saude Publica. Serviço de Saneamento e Prophylaxia Rural no Estado do Para.* 1923. 102 pp. With 4 illustrations.

This book, written by the Director of the Sanitary Service of the State of Pará, is of the nature of a condensed treatise on leprosy. In a review such as this one cannot do more than indicate the scope of the work and lay stress upon a few of the chief points.

Among the introductory remarks the most important transmitting agents are stated to be *Culex fatigans* and *Culex pipiens*. The disease is divided into the stages of Primary Infection, usually unperceived, followed by an Incubation period of three to five years, as a rule. Various prodromal symptoms next make their appearance in the form of itching, burning eruptions, obstinate catarrh and transient febrile attacks. The symptoms and signs of the disease itself are then described. It is stated that in nodular leprosy the Wassermann reaction is positive in 100 per cent. Section 5 deals with attempts at cure, with a brief incidental discussion of the question of spontaneous cure. Various vaccines—Clegg's Bayer's, Kedrowsky's, and others, and Nastin B.—are mentioned, and chemotherapy by salvarsan, its derivatives and allies, and copper preparations. The succeeding eight sections deal with chaulmoogra oil: its sources, the different methods of treatment by its means, special mention being made of the work of Sir Leonard ROGERS, MUIR and PEACOCK, in India, followed by an account of the ethyl esters of the oil, giving in detail the technique of their preparation. Chaulmoogra oil as obtained in Brazil and its employment for the treatment of the disease in that country next claim attention, and the author states that its "specific action is as a direct chemicotherapeutic agent and not as a stimulus to phagocytosis." He then turns to the disease as seen and treated in Brazil; the mode of life of the patients is described, and it is stated that 200 cases have been cured there in two years by the ethyl esters of the oil prepared by Drs. HOLLMAN and DEAN, of Honolulu; that 25 per cent. of those in the hospital have been apparently cured, judging by clinical and bacteriological tests, none of those sent out, even so long as two years ago, having shown any signs of relapse.

In section 13 the author describes the methods adopted in the service of which he is the head. Within three months of inauguration of the Preventive Institute 778 lepers had been examined. The material used for injection is prepared locally as follows:—Chaulmoogra oil 600 gr., camphorated oil 600 gr., and resorcin 40 gr. are well mixed and heated in a water-bath at 60°–70°C. for half an hour till completely dissolved, then filtered while hot, tubed and autoclaved at 125°C. for half an hour. The initial dose for adults is 1 cc., increasing to 3–4 cc. given intramuscularly. After 20 to 30 injections during a period of three months there is definite improvement, which is very marked in six months. General hygiene—diet, baths, ventilation, sunlight—and symptomatic treatment also receive attention.

Subsequent sections deal with the housing of lepers, the establishment of the agricultural colony system, and a description is given of the projected "Lazaropolis of Prata," dealing with the questions of site, the buildings and their arrangement, the numbers of patients to be accommodated, and general administrative measures.

The book terminates by quoting the conclusions and resolutions of the American Leprosy Conference held at Rio de Janeiro in October, 1922.

H. Harold Scott.

DE QUERVAIN (F.). [Professor of Clinical Surgery in the University of Berne.] [Translated from the French by SNOWMAN (J.).] **Goitre. A Contribution to the Study of the Pathology and Treatment of the Diseases of the Thyroid Gland.**—pp xii+247. With 118 illustrations & Bibliographical Appendix. 1924. London: John Bale, Sons & Danielsson, Ltd., 83–91, Great Titchfield Street, Oxford Street, W.1. [Price 21s.]

Professor F. de Quervain's book on "Goitre" is a most interesting contribution to the study of the Thyroid Gland and its diseases. It represents the views of the Berne school, which in the past has contributed largely to our knowledge of the subject. Dr. Snowman is to be congratulated on the excellence of his translation of the book from the French. It is in the main a treatise on the surgical aspect of goitre and is intended to act as a guide for those in search of a method of operative procedure rather than for those who are satisfied with their own. The first eight chapters deal with the surgical anatomy, physiology, aetiology, pathological anatomy, pathological physiology, diagnosis, prophylaxis, and non-operative treatment of goitre. These chapters, in addition to the fifteenth and seventeenth, provide instructive and up-to-date reading for the physiologist and physician as well as for the surgeon. From the ninth to the fourteenth chapter Professor de Quervain deals with his main theme: the operative treatment of goitre. Chapter fifteen, devoted to the surgery of thyroid deficiency, provides opportunity for the discussion of hypothyroidism, and more particularly of cretinism, and deals with the relation of thyroid inadequency to imbecility and idiocy, cerebral diplegia, "nervous cretinism," slight functional disorders of the nervous system, and to deaf-mutism. Chapter sixteen deals with the practical aspects of the diagnosis and treatment of Graves's Disease. For Dr. de Quervain surgery is the method of dealing successfully with this condition—a view which is less likely to be generally accepted as our knowledge of the causation of Graves's Disease increases.

This book can be recommended to all those who desire to possess an authoritative guide to the thyroid gland and its diseases. It is well illustrated.

R. McCarrison.

MEDICAL RESEARCH COUNCIL. **Diphtheria. Its Bacteriology, Pathology and Immunology.** [ANDREWES (Frederick W.), BULLOCH (William), DOUGLAS (S. R.), DREYER (Georges) & GARDNER (A. D.), FILDES (Paul), LEDINGHAM (J. C. G.) & WOLF (C. G. L.).—544 pp. With 6 plates & 15 text figs. 1923. London: Published by H.M. Stationery Office. [Price 12s. 6d. net.]

This monograph is designed to include all that is real knowledge concerning the bacteriology of diphtheria. The rather novel method of compilation is described in the preface. The eight authors, all expert bacteriologists, are conjointly responsible for all the book contains, and nothing was passed on to the printers unless it satisfied them all. The result is much more readable than might be expected. When studying the work one feels a sense of confidence in the argument such as is rarely experienced in the perusal of ordinary medical literature. In the volume, which contains 544 pages, more than 120 are devoted to a bibliography which the authors consulted. This bibliography is admitted to be incomplete, as many papers were not considered of sufficient merit to be inserted. The magnitude of the task of making this book cannot be better realized than by studying this interminable list of references.

Chapter I. gives a brief history of diphtheria. It is instructive to note how, in diphtheria as in other infections, the older literature was vague and

chaotic until the discovery of the causative bacillus by KLEBS in 1883, followed by LOEFFLER's masterly investigations on the characters of the organism and its relation to clinical diphtheria.

In Chapter II. the morphology and cultural characters of the diphtheria bacillus are described. The authors, following the latest attempt at a scientific classification of the bacteria, name the organism *Corynebacterium diphtheriae*. The chief characters of the bacillus are its pleomorphism; short and long, barred, "streptococcal" and branched forms, occur in varying proportions in nearly all strains to such an extent as to make any morphological classification of the strains and types of bacilli unreliable. All true *C. diphtheriae* stain by Gram's method and show metachromatic granules with suitable stains. For this purpose Neisser's method (or one of its modifications) still holds its own against others. Diphtheria bacilli always ferment glucose but not sucrose. Any organism that does not satisfy these conditions is not *C. diphtheriae*. There are, however, avirulent bacilli similar in all these respects except that they fail to produce toxin. The final proof that a bacillus is a real potential cause of diphtheria has to be made by an animal virulence test.

Chapter III. reviews the metabolism and toxin production of the diphtheria bacillus. The subject is highly technical and includes a criticism of the action of "endotoxin" apart from the familiar "exotoxin." The authors conclude that diphtheria endotoxin is of no proved value in the preparation of therapeutic sera or for use as a vaccine to treat diphtheria carriers.

Chapter IV. deals with diphtheria antitoxin and its preparation. Serum taken from immunized horses can now be concentrated so as to contain 3 to 5 times the concentration of antitoxin that was originally present; and non-essential proteins can be removed to such an extent that the concentrated serum contains only the same amount of protein as is present in normal horse serum, *i.e.*, 7–8 per cent. This is a technical achievement of great importance, because for therapeutic uses as little foreign protein as possible should be introduced with the requisite dose of antitoxin.

Chapter V. is on the pathology of diphtheria. The most constant lesions in a guineapig which has been killed by an injection of diphtheria bacilli are haemorrhages into the adrenal glands causing them to appear pink to black-red instead of the normal white. In man the adrenals in a fatal case of diphtheria rarely show naked-eye changes. The brunt of the mischief apart from the local condition falls on the heart and nervous system. The heart may show any kind of degeneration in both muscle-cells and interstitial tissue. As regard the nervous changes in man due to diphtheria bacillus, there is still considerable lack of agreement as regard details. However, all authorities concur that most change takes place in the peripheral nerves, especially those supplying any part which is actually paralysed.

Chapter VI. expresses the modern views on the laboratory diagnosis of diphtheria. First of all the clinician must realize he alone is responsible for the diagnosis and immediate treatment of his patient. The laboratory report is useful confirmatory evidence, but treatment of clinical diphtheria must not be delayed until the laboratory report arrives; and should the result be negative it is no excuse for withholding antitoxin from a patient, clinically diphtheria. Secondly as regards the pathologist. Reports on directly stained films are to be deprecated, except in a few cases where numerous and unmistakeable bacilli are seen, when a tentative positive report may be justifiable. Cultures from throat swabs on Loeffler's medium, which still holds its own for this purpose, give twice as many positive results as directly stained smears. For practical purposes, if bacilli morphologically identical with *C. diphtheriae* are seen in a 16 to 48 hours culture from a throat of a clinical diphtheria case they may be presumed to be virulent. This presumption is only justified when culture has been made from a membranous sore throat; in all other cases an attempt must be made to isolate the bacillus and test it for virulence, when, as

likely as not, it will prove to be harmless. The various virulence tests are described, namely "whole mixed primary culture," pure sub-culture, and intracutaneous.

In Chapter VII. the serum treatment of diphtheria is discussed. The subject is so important that the authors' own summary of their opinions will be given.

"All cases clinically diagnosed as either definitely or probably diphtheria should be given antitoxin at once, unless the disturbance of health is extremely slight. A swab must always be taken, but it is only in very mild and doubtful cases that it is justifiable to withhold antitoxin for 24 hours in waiting for the result of a bacteriological examination . . . .

"Dosage should be based on the figures given in table below. A single dose containing the total quantity of antitoxin required by the case is considered by most modern authorities to be the ideal method of treatment. This dose (if very large) may be given partly into a vein and partly into the muscles. In some cases part, at least, of the dose should always be given intravenously."

*Dosage table modified and abbreviated.*

| | |
|---|---|
| Infants under two years .. .. | 3,000—10,000 units |
| Children under 15 years .. .. | 4,000—20,000 units |
| Adults .. .. .. .. | 5,000—50,000 units |

First figure only for very mild cases, last figure for severe and malignant cases. For mild and moderate cases the serum should be given into the muscles, for severe and malignant cases the intravenous route is advised. When in doubt always give the larger dose and repeat early if there is no amelioration of the symptoms. Serum disease and so-called "anaphylaxis" have always been a bogey to many practitioners. This fear of accidents following serum treatment has probably caused many more deaths indirectly than have even been directly caused by the injection of foreign protein into the human body; therefore some opinions of the authors on this subject are important.—(1) Concentration of antitoxin is the most promising means of reducing the incidence of serum sickness.

(2) It is doubtful if true anaphylactic shock ever occurs in man.

(3) Accidents after inoculation are so rare that no physician should ever withhold antitoxin because of them.

(4) Accidents and severe serum sickness are more common after a previous injection and when the antitoxin is given intravenously. Therefore intravenous reinjections should be reserved for severe cases only.

The next two chapers, VIII. and IX., are, in the reviewer's opinion, the most interesting in the book. For almost the first time the experimental method has been used in the study of epidemiology. This has been rendered possible by the fact that diphtheria is unique among common epidemic diseases in producing an easily recognised antitoxin in the immune. The absence of this antitoxin in those susceptible to diphtheria is proved by injecting very dilute toxin into the skin when an inflamed red patch at the site of inoculation shows there is no antitoxin present to inhibit this reaction. This is the rationale of the Schick test, whose applications are described in the study of the spread of diphtheria.

Chapter IX. describes diphtheria prophylaxis. Passive immunization with serum and active immunization with toxin antitoxin mixtures are discussed. The carrier problem receives attention, and it is worth noting that the authors consider surgical interference the only hopeful cure for the chronic diphtheria carrier.

Chapter X. ends the book, and the reviewer has read no better attempt at dispersing the mist of vague conceptions usually conveyed by the word "diphtheroid."

In conclusion, the book is a mine of information, though it has only been possible to review one or two points of more general interest. To anyone who is working on the subject it is indispensable for reference purposes. The authors are to be congratulated on their masterly summary of the

scientific basis of our knowledge of diphtheria. It is earnestly hoped the Medical Research Council will undertake the production of other works of a similar kind on different subjects, and thus save from despair those seekers after truth who have neither time, opportunity, nor sufficient experience to search and sift for themselves that vast mass of fact and fiction known as "the literature" of a subject.

The monograph contains no reference to any typical aspects of the bacteriology of diphtheria, perhaps because no essential difference exists in the laboratory procedures concerned at home or abroad.

S. F. Dudley.

DOHI (Keizo). **Beiträge zur Geschichte der Syphilis insbesondere ueber ihren Ursprung und ihre Pathologie in Ostasien.** [The History of Syphilis, with Special Reference to its Origin and Pathology in Eastern Asia.]—145 pp. With 25 figs. & 4 plates. 1923. Tokyo: Verlag von Nankodo, Hongo Harukicho 3 chóme.

This is an amplification of a work in Japanese, which was published in 1921 by the same author, who is Professor of Dermatology and Urology at the University of Tokyo. About half of the book is devoted to the consideration of the origin of syphilis, and of its first appearance in the Far East. The author has studied personally the old Chinese and Japanese literature on the subject, as a result of which he opposes the opinion of SCHEUBE and others that syphilis existed in China and Japan before the sixteenth century. He has also considered the human tibia and fibula found in 1895 near Tokyo, and considered by ADACHI to show evidence of the existence of syphilis in the Stone Age; he quotes ADACHI's description of the bones, but he doubts both their antiquity and the nature of the pathological condition they are said to exhibit.

It appears that the ancient Chinese medical authors do not describe any disease that can be identified indubitably with syphilis, though a book of the seventh century gives a recognizable description of a soft chancre. As regards Japan, the book *Daido-rui-ju-ho*, attributed to the ninth century, was considered by SCHEUBE to prove the existence of syphilis at that time; but the author agrees with OKAMURA that the date ascribed to this book is inaccurate. He points out that the descriptions of the symptoms are too objective and modern, and contrast too forcibly with those of other old Japanese authors. He considers that this book may possibly date from the sixteenth, but more probably from the seventeenth century.

According to HIRSCH ("Geographical and Historical Pathology"), "in the Ayur-Veda of Susruta, there are several statements which make it at least very probable that venereal disease had occurred in India from the very earliest times." Dr. Dohi is of opinion that the descriptions are too vague and insufficient for such a conclusion. He considers that syphilis is a new-comer in India as in the rest of Asia. He argues that many diseased conditions of the skin, such as occur in leprosy, scabies, elephantiasis, etc., are described with much accuracy in the works of ancient Asiatic authors; if syphilis occurred in olden times, its remarkable effects on the skin, mucous membranes and bones, could not have escaped the notice even of laymen. Why, then, does one not find a description of syphilitic conditions with the unmistakable clearness with which accounts are given of these other diseases? He also points out that special attention was paid to the genital organs in countries where phallic worship prevailed, and yet there is no certain description of syphilitic chancres.

Dr. Dohi accepts the theory of the American origin of syphilis, and of its first appearance in Europe after the return of Columbus to Spain, soon after which the disease prevailed throughout almost the whole of Europe in the form of a severe epidemic.

The first documentary evidence of the existence of syphilis in China is found in a book, *Tsuh-i-shut*, which appeared in 1545, where it is stated that the disease occurred towards the end of the time of *Hung-chih*

(1488–1505); this is confirmed by other contemporary works. About ten years after the return of Columbus, and one to ten years after the landing of Vasco da Gama in India (1498), syphilis broke out in epidemic form at Canton. The Portuguese took Ceylon in 1505, Malacca in 1509, and Canton in 1515–17. The outbreak in Canton occurred about fifteen years before the arrival of the Portuguese; most likely it was brought there by Chinese seafarers from the Southern Seas. So, too, in Japan, syphilis was recognized about thirty years before the Portuguese came to that country; it seems to have been introduced from two sources, on the one hand from the Liukiu Islands, and on the other from China.

The author does not discuss the reasons that have been brought forward against the supposition that the original home of syphilis was America. And the fact that he has not been able to find any undoubted description of the disease in the writings of Chinese, Japanese or Indian authors prior to the sixteenth century does not necessarily imply that syphilis did not occur in Asia before that period. There is a similar lack of exact description in the works of ancient European writers, though, according to Hirsch, "The Paris physician, Gérard de Barry (thirteenth century) refers to an '*alteratio totius corporis*,' resulting from '*ulceribus et apostematibus virgae*,' which must mean a constitutional malady associated with a preceding infection of the '*virga*.'" From the nature of the disease it seems unlikely that secondary and tertiary symptoms and lesions would be considered to have any connexion with a primary chancre until the study of pathology had made considerable progress, and until syphilis had attracted general attention by its presence as a wide-spread epidemic. It is not at all surprising, therefore, that the old authors did not describe the disease as a coherent whole.

The second part of the book is occupied by an account of the growth of the knowledge of the pathology of syphilis. The author gives an interesting survey of the Chinese and Japanese literature from the sixteenth century onwards. Rapid advances in knowledge were made, largely as the result of Portuguese and Dutch influence on Oriental medicine. About the middle of the eighteenth century, an admirable account of practically all the manifestations of syphilis was given by the Japanese physician, KAGAWA.

Dr. Dohi's book is written in an attractive style, and his personal study of the old Chinese and Japanese authors gives it an exceptional value. It is embellished by a number of interesting illustrations.

H. J. Walton.

MENSE (Carl). **Handbuch der Tropenkrankheiten. 2te Auflage. Band 4. Zweite Hälfte.**—pp. 301–777. With 145 text figs., 13 charts and 2 coloured plates. 1923. Leipzig: Johann Ambrosius Barth.

Die Blutprotozoen und ihre nächsten Verwandten. (von Dr. R. KUDICKE.) Chagas'sche Krankheit. (Amerikanische Trypanosomenkrankheit.) (von Dr. Martin MAYER.) Rückfallfieber, (von Prof. Dr. Joseph FORSCHBACH.) Kala-Azar oder innere Leishmaniosis. (von Prof. Dr. Umberto GABBI.) Wenig bekannte Krankheitsbilder und Krankheitsbezeichnungen. (von Prof. Dr. C. MENSE.)

This volume, which contains articles on the Blood Protozoa, Chagas' Disease, Relapsing Fever and Kala Azar, together with an appendix on certain little-known tropical diseases, is similar to other volumes of this well-known series. The standard of these articles, which give an account of the subjects as they stood two or three years ago, is undoubtedly a good one. The illustrations, though not of a particularly high grade, are instructive and serve the purpose for which they were intended. There are lengthy bibliographies of literature, extending to about 125 pages.

The first article, which deals with Blood Protozoa, is divided into two sections, the one describing the flagellates together with the closely allied forms in insects, the other the Sporozoa, the affinities of which are explained by an introductory account of the Coccidia with which they are closely related. The section devoted to the blood flagellates occupies 194 pages and deals with the trypanosomes of mammals, birds, reptiles, amphibia and fish, the leishmania, and the insect flagellates belonging to the genera *Herpetomonas, Crithidia* and *Rhynchoidomonas.* The morphology, development, method of transmission and inter-relations of these various types is fully described. The pathogenic trypanosomes of man and animals receive special attention. It may be noted that *T. cazalboui* and *T. vivax* are regarded as distinct species, though there is much evidence in favour of their identity. The same remark applies to *T. pecorum* and *T. congolense.* In the second section, which extends to 108 pages, the life-histories of coccidia of the genera *Eimeria* and *Adelea* are first described and reference is made to the coccidia of man. The position of the blood-inhabiting Sporozoa in relation to the intestinal coccidia is carefully explained and, following the results of recent investigations, particularly those of Nöller and Reichenow, the blood Sporozoa are arranged in two groups according as the fertilization process is of the *Adelea* or of the *Eimeria* type. In the former are included the haemogregarines and the leucocytozoa of birds and in the latter the pigmented parasites, which are regarded as belonging to four genera—*Haemoproteus, Plasmodium, Proteosoma, Haemocystidium.* It is very doubtful if the Leucocytozoa are as nearly related to the haemogregarines as such a system implies, while it seems probable that the genera *Proteosoma* and *Haemocystidium* should be submerged in *Plasmodium* and *Haemoproteus* respectively. The whole article on the Blood Protozoa is a most comprehensive one and presents the reader with a vast amount of reliable information regarding these parasites.

The article on Chagas' Disease covers 8 pages. In consequence of its shortness, which was intentional, it is less complete than others. Nevertheless it is free from errors and gives all the essential facts. Relapsing fever as it occurs in the tropics is dealt with in 67 pages. The disease is first discussed in a general manner from the clinical, pathological and parasitological points of view, after which the Central African, North African, American and Asiatic types are individually considered, while a final section deals with the treatment of the disease. The last of the four articles is on Kala Azar, and in the 40 pages the disease is considered in all its aspects. In a final appendix are to be found notes on about 80 diseases or conditions of unknown aetiology which have been recorded from the tropics. This forms a very useful compendium which will be of service for purposes of reference.

C. M. Wenyon.

Simon (Charles E.) [B.A., M.D., Lecturer in Medical Zoology, School of Hygiene and Public Health of the Johns Hopkins University.] **A Manual of Clinical Diagnosis by Means of Laboratory Methods for Students, Hospital Physicians and Practitioners.**—pp. xxiv+1125. With 233 engravings and 23 plates. 10th Edition, enlarged & revised. 1922. London: Henry Kimpton, 263, High Holborn, W.C. [Price 42s.]

The exigencies of modern practice demand of the clinician an ever-increasing intimacy with the methods of the laboratory, and the fact that this work has reached its tenth edition in the comparatively short span of twenty-five years bears some testimony to its value and to the success of its author's efforts to keep it "up to date."

The book is divided into two parts: Part I. treats of General Principles and Technique, and embraces all the commoner methods employed in

laboratory diagnosis. Part II. deals with the Essential Factors in the Laboratory Diagnosis of Various Diseases.

No less than 294 pages are devoted to the examination of the blood. A great deal of attention is given to the descriptions of stains and staining methods, and graphic formulae of some of the more important anilin dyes are shown, but, on the other hand, in dealing with some of the other methods of blood examination there is a tendency to restrict descriptions to a single method or to a single instrument out of several in common use. A valuable feature of the section is the brief but lucid accounts of the biochemical methods employed in the quantitative estimation of blood-sugar, blood-urea, cholesterol, fats and fatty acids and other constituents of the blood.

A matter calling for special criticism is the description of the Iso-haemolysins and Iso-haemagglutinins of normal blood (p. 239). The theory of agglutinins and agglutinogenesis and their groupings is very clearly expounded, but the description of Moss's groups is rather confused and, in parts, inaccurate, possibly due to some confusion with the system of LANDSTEINER. A diagram from SANFORD graphically illustrating the interactions between the corpuscles and sera of the different groups serves, however, to clear up many of the obscurities in the text.

In considering tests for syphilis the Wassermann modifications of NOGUCHI are dealt with briefly, and mention is made of BERGHAUSEN'S cold-fixation method, but a lengthy account is given of the author's own modification, the special features of which are the preliminary absorption of any anti-sheep-cell amboceptor present in the human test sera by saturation with washed sheep cells, and a quantitative determination of *syphilitic antibody* based on the author's thesis that the velocity of complement fixation is directly proportionate to the quantity of syphilitic antibody present. Thus *instant fixation* of the complement by the test serum in the presence of the lipoid antigen without incubation is stated as Wassermann 100 per cent. or 60 units, while sera requiring sixty minutes' incubation for fixation are said to be Wassermann 1 per cent. or 1 unit, and other quantities are calculated in a similar manner. It is claimed for this method that it gives fewer erroneous results than the *standard* methods, and that it readily distinguishes between the pseudo-positives which occur in scarlatina, malaria, &c., and the true positives of syphilis. If this claim can be substantiated, the apparent tediousness of the method will be fully recompensated. Other serological tests dealt with are the flocculation reactions of SACHS-GEORGI and MEINICKE.

The section on blood is completed by a short account of the Reaction of Abderhalden and its applications. One regrets to find in this admirable and almost exhaustive section no mention of the biological tests for the identification of "human" blood, but such an inclusion might rightly be considered out of place in a book on *clinical* diagnosis.

The Gastric Juice and Stomach Contents are dealt with in a chapter of 45 pages, which includes test meals, methods for obtaining material from the stomach and duodenum, and clear descriptions of the commoner biochemical tests. An excellent account of the Refuss method for fractional study of gastric digestion is also given. This is followed by a chapter of 250 pages on the Faeces, of which 30 pages deal with methods of examination in common use, and five pages with the chemistry of the faeces. Both could with advantage be amplified. The remaining 215 pages treat of the animal parasites infesting the bowel, and include the study of their morphology, life-history and geographical distribution, as well as methods of examination.

The chapter on the urine occupies 200 pages and is one of the most valuable in the book; 140 pages are devoted to chemical and 40 to microscopical examination. Renal functional tests are dealt with rather briefly, and the important quantitative diastase test is not included.

Part II. of the book deals with the essential factors in the laboratory diagnosis of various diseases in alphabetical order and forms a useful reference guide. In some instances, however, factors are discussed which

have but little bearing on diagnosis, while in others the really vital points are omitted; thus in rabies the blood and urine alone are referred to.

Regarding the book as a whole, the contributions on biochemical methods and on animal parasitology are excellent, the descriptions are clear and well illustrated, and in this respect the book should possess a considerable value to the laboratory worker. Concerning the bacteriology, however, one must confess to some disappointment. There is a constant tendency to sacrifice clearness to brevity, and apart from slips some definite errors occur; as examples, the statements that *M. melitensis* is motile (p. 821) and *B. mallei* has a spore at one end (p. 824). In a short table on page 379 the milk reactions of *B. typhosus* and *B. paratyphosus* A are transposed. *B. paratyphosus* A is also shown as fermenting lactose with aerogenesis and acidity and forming no gas from mannitol, while *B. paratyphosus* B is stated to have no action on mannitol and to form no gas from dextrose. It is also stated that "fungi with the exception of *Oidium albicans* are rarely found in the faeces," but that *Saccharomyces cerevisiae*, which is described as a schizomycete, "is one of the normal constituents of the faeces." In the special bacteriological appendix the two methods recommended for the standardization of the reaction of culture media are not sufficiently accurate, and more detailed instructions in the preparation of media are desirable.

The book is of convenient size and is well got up, and the quality of the paper, the printing and the binding reflects credit on the publishers. The illustrations, both colour plates and text figures, are excellent, with the exception of one on page 193, attributed to DOFLEIN. However, if the book is to continue its career of usefulness and keep pace with the rapid development of knowledge in the ancillary subjects it would seem that the time has come for the author to enlist the aid of specialist contributors for these subjects.

J. T. Duncan.